



GROUND WATER CLASSIFICATION EXCEPTION AREA MODEL AREA 29 - FIRE TRAINING AREA

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TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
1.0 INTRODUCTION.....		1
2.0 CONCEPTUAL MODEL		2
2.1 Hydrology.....		2
2.2 Geology.....		2
2.3 Hydrogeology.....		3
2.4 Metals Impacts To Ground Water		4
3.0 MODEL DEVELOPMENT		5
3.1 Numerical Code		5
3.2 Model Domain		7
3.3 Finite Difference Grid		7
3.4 Boundary Conditions		7
3.5 Flow Calibration.....		10
3.6 Solute Transport Calibration.....		12
4.0 PREDICTIONS (CEA DELINEATIONS).....		14
5.0 CONCLUSIONS.....		15
6.0 RECOMMENDATIONS		16
7.0 REFERENCES.....		17

TABLE OF CONTENTS
(Continued)

FIGURES

- 1 Site Location Map
- 2 Area 29 Site Detail Map
- 3 CEA Model Domain
- 4 Grid and Boundary Conditions
- 5 Calibrated Unconfined Aquifer Potentiometry
- 6 Unconfined Aquifer Head Calibration Errors
- 7 Infiltration Gallery Ground Water Mounding
- 8 Calibrated Sodium Concentrations – 3 Years
- 9 Area 29 CEA Outline – 10 Years
- 10 Area 29 CEA Outline – 20 Years
- 11 Area 29 CEA Outline – 30 Years

APPENDICES

- A Area 29 Treatment Plant Influent and Effluent Concentrations
- B Historical Metals Concentrations in 29-MW16S, 29-MW17S, 29-MW18S, and 29-MW19S
- C Area 29 Ground Water Remediation System Effluent Flow Data
- D August 2008 Metals Concentrations in 29-MW16S, 29-MW17S, 29-MW18S, and 29-MW19S

1.0 INTRODUCTION

A numerical ground water flow and solute transport model was constructed and calibrated for delineating a ground water Classification Exception Area (CEA) for Area 29, Fire Training Area at the Federal Aviation Administration (FAA) William J. Hughes Technical Center (Technical Center) at the Atlantic City International Airport in New Jersey (Figure 1). The modeling was performed in accordance with the requirements of the New Jersey Pollutant Discharge Elimination System - Discharge to Ground Water (NJPDES-DGW) Permit Equivalent, dated February 8, 2002, and the New Jersey Department of Environmental Protection (NJDEP) letter, dated October 16, 2002 for Area 29. The NJDEP issued the permit equivalent to monitor discharge activities associated with the operations of the ground water remediation system at Area 29.

Treated ground water from the remediation plant is discharged to an infiltration gallery (Figure 2), generally during the winter months, and to sprinklers in the area of the ground water extraction wells (Figure 2) for the other months of the year. The treated and discharged ground water has artificially elevated concentrations of alkali metals (sodium and potassium), alkaline earth metals (calcium and magnesium), and manganese (Appendix A) due to the treatment processes (i.e., addition of sodium hydroxide and potassium permanganate for iron removal). The concentrations of these metals in the discharge water (effluent) are anticipated to raise ground water concentrations above background concentrations hence the need for a ground water CEA for this area.

The sprinkler discharge water is believed to be entirely captured by the ground water extraction wells. These wells are completed in a perched water zone of finite extent, owing to the occurrence of a localized low permeability layer (aquitard) of clay and silt below the perched saturated sediments (TRC, 1996a, b). Monitoring wells completed in the "true" water table aquifer (henceforth unconfined aquifer) down-gradient of the area of perched water do not exhibit evidence of elevated metals indicating that the sprinkler discharge water is not leaking through or spilling over the edges of the aquitard. The objective of the CEA modeling effort for Area 29, therefore, is to delineate the area of the unconfined aquifer impacted by metals at concentrations above background resulting from the discharge of effluent to the infiltration gallery.

2.0 CONCEPTUAL MODEL

2.1 Hydrology

The 30-year (1971 through 2000) average annual precipitation at the Atlantic City International Airport (ACY) reported at the State Climatological Center at Rutgers University is 40.59 inches (http://climate.rutgers.edu/stateclim_v1/norms/daily/atlanticcityap.html). Some of this precipitation recharges ground water at the location of the incident precipitation at a rate that is a percentage of the precipitation rate, and some of the precipitation runs off to streams, ponds, lakes, or lower slope areas, where a higher recharge rate may occur. The remainder of the precipitation is evaporated or evapotranspired. The low slope area in the vicinity of the ground water extraction wells receives runoff from the topographically higher and steeper areas to the northwest, west, and south. Some of this runoff recharges ground water in this low slope area.

The North Branch Absecon Creek (NBAC) (Figure 1) is a local control on ground water flow and discharge. This creek is perennial in the upstream direction to at least the culvert beneath the dirt service road to the west of Area 29, indicating ground water discharges from the culvert to its terminus in the Lower Atlantic City Reservoir. The Upper Atlantic City Reservoir also influences ground water flow in the area modeled for the Area 29 CEA. A local ground water divide occurs to the northwest of Area 29 as a result of incident precipitation on the topographic ridge between Area 29 and the NBAC, where some of this precipitation discharges as ground water. The infiltration gallery is located on the southeast side of this divide. Except for localized, temporary mounding and divergent flow during gallery usage, the water discharged to the gallery ultimately flows eastward from the gallery.

The perched ground water in the low slope area that includes the ground water extraction wells is recharged by precipitation, runoff, and sprinkler discharge. The net infiltration from sprinkler discharge is captured by the ground water extraction wells (TRC, 1996b). This perched ground water, the ground water extraction wells within the perched ground water, and the clay and silt layer beneath the perched water have very little influence on ground water flow in the unconfined aquifer. The presence of the clay and silt at the top of the unconfined aquifer generates local confined conditions, but the aquitard does not generate divergent flow of ground water in the unconfined aquifer.

2.2 Geology

Area 29 is underlain by the Upper Cohansey Sand. The Cohansey Sand is part of an Atlantic Coastal Plain, seaward-dipping wedge of unconsolidated sediments that range in age from Cretaceous to Holocene (Rooney, 1971). These sediments were deposited in beach and shelf environments. Interbedded fine-grained sediments are transgressive marine deposits that formed during major incursions of the sea.

The Tertiary Cohansey Sand is generally a deltaic deposit, but it contains sediments from nearshore marine, fluvial, estuarine, lagoonal, and beach environments (Rhodehamel, 1973). The Cohansey Sand is composed of fine to coarse quartz sand, lenses of clay, and lenses of gravel (Hardt and Hilton, 1969). Grain size varies both vertically and laterally, which is consistent with deposition within a coastal environment.

The local geology of the site is described in TRC (1996b). Generally, the upper 10 to 22 feet of soil within the perched water zone of Area 29 is dominated by fine to medium sands. In some areas, this upper sand unit contains appreciable amounts of silt. Beneath this perched zone, a clayey-silt layer up to 18 feet thick occurs, which pinches out in all directions beyond the triangular-shaped area defined by the dirt roads that outline the central area of the site. This clayey-silt layer is generally bowl-shaped and thickest in the center of the site. Fine-grained sand generally occurs beneath the clayey-silt layer. Beyond the area of the clayey-silt layer, textures in the unconfined aquifer range from fine to coarse sand.

2.3 Hydrogeology

The hydrogeology of the site is described in TRC (1996a, b). Infiltration of precipitation and runoff above the local low-permeability clayey-silt layer beneath the site results in a discontinuous shallow zone of saturation and a mounded, perched water table that is 3 to 6 feet below ground surface. Natural ground water flow in this perched zone is radially outward from the center of the site. The extraction wells generate local cones of depression within this mound of water, and capture the infiltration of sprinkler water applied in the area of the wells.

Monitoring wells completed in the deeper ground water system below the clayey-silt layer have water levels 14 to 16 feet below ground surface. This system is locally confined, but is an unconfined water table aquifer beyond the clayey-silt layer and perched water. Flow in this unconfined aquifer is generally to the east beneath the site, including the area of the infiltration gallery.

Aquifer test data for the perched water system suggest a wide range in hydraulic conductivity, from 0.3 to 132.8 feet/day. This wide range is partly a function of separate data from a number of test observation wells, which may be completed in somewhat variably transmissive sediments as well as within variably thick perched saturated sediments, and the use of a single 20 foot saturated thickness in calculating the hydraulic conductivity. The hydraulic conductivity of the perched aquifer system, therefore, is probably more uniform than the range of numbers indicates.

Aquifer test data for the unconfined aquifer suggest a range in hydraulic conductivity of 0.1 to 10.6 feet/day, based upon several observation wells and a single aquifer thickness assumed to be 80 feet. Although this range is much less than the perched system, the same arguments apply for a probable more uniform hydraulic conductivity.

Data from each of the pumping tests in the perched and unconfined aquifers suggest the hydraulic communication between the two systems is extremely limited. The response data from observation wells completed above or below the pumping well are time-sensitive, and the conclusion about no hydraulic communication (TRC, 1996a) essentially means that the hydraulic conductivity of the clayey-silt is very low, and communication is limited. The communication is effectively nil across most of the area of the clayey-silt layer where there is appreciable thickness. This conclusion is supported by historical ground water sampling and analysis data, indicating no contaminants in the perched aquifer have migrated to the unconfined aquifer. Natural attenuation may have played a role, and the effects of pumping in the perched system may have decreased the downward vertical gradients resulting from a perched system.

2.4 Metals Impacts To Ground Water

Treated ground water with elevated metals (sodium, potassium, calcium, magnesium, and manganese) concentrations is discharged in both the infiltration gallery and from sprinklers in the area of the perched water. There is no evidence in the monitoring well data that any of the sprinkler discharge water is mixing with the unconfined aquifer, either through vertical migration through the clayey-silt layer or through spilling over the edges of the clayey-silt layer. Apparently, all of this sprinkler discharge water is captured by the extraction wells.

The treated ground water that is discharged to the infiltration gallery is slowly raising sodium concentrations in the ground water in the vicinity of the gallery. Gallery usage began in November 2004. Appendix B contains the historic (2002 through June 2008) metals ground water data for the monitoring wells located near the gallery, 29-MW16S through 29-MW19S.

None of the metals in the treated discharge water is expected to be completely geochemically inert with respect to transport in ground water. Controls on their fate and transport include adsorption and cation exchange. Retardation of the transport velocity and reactivity are expected to be lowest for the univalent metals, sodium and potassium, due to their small ratio of charge to ionic radius. Sodium is expected to be more mobile than potassium (Hem, 1992). For these reasons and the availability of data on sodium concentrations in ground water (Appendix B), the transport modeling and CEA delineation were based on the calibration and future transport of sodium.

The background concentration of sodium in ground water at Area 29 was determined to be 2,340 micrograms per liter ($\mu\text{g/L}$) as a result of baseline ground water sampling conducted in May 2003. Reported concentrations of sodium in monitoring wells near the infiltration gallery, (29-MW16S through 29-MW19S (Appendix B)), prior to its usage include this value and similar values.

3.0 MODEL DEVELOPMENT

The three-dimensional, numerical ground water flow and solute transport model developed for Area 29 (Area 29 CEA Model) simulates saturated flow and transport processes. The model transiently incorporates the seasonal usage of the infiltration gallery, as well as net infiltration of incident precipitation, net infiltration of runoff, sprinkler discharge to the perched water zone, and extraction well pumping from the perched water zone. The model accounts for advection, dispersion, and mild retardation of the sodium transport velocity. The code that was used is capable of integrating these concurrent stresses and processes, and sufficiently robust to handle the non-linearity of the simulations.

3.1 Numerical Code

MODFLOW-SURFACT, Version 3.0 (HydroGeoLogic Inc., 2008), was used for the ground water flow and solute transport modeling. MODFLOW-SURFACT is a fully-integrated ground water flow and solute transport code based on the widely-used and accepted U.S. Geological Survey modular, three-dimensional (3-D) ground water flow modeling code, MODFLOW (e.g., McDonald and Harbaugh, 1988 and later MODFLOW versions).

MODFLOW is a block-centered, finite-difference mathematical model, written in FORTRAN, which uses approximations of the partial differential equation describing the 3-D migration of ground water of constant density through porous media:

$$\partial/\partial x(K_x\partial h/\partial x)+\partial/\partial y(K_y\partial h/\partial y)+\partial/\partial z(K_z\partial h/\partial z)-W=S_s\partial h/\partial t \quad 1)$$

K_{xx} , K_{yy} , and K_{zz} = hydraulic conductivity along the x, y, and z coordinate axes;

h = potentiometric head;

W = volumetric flux per unit volume, representing sources and/or sinks of water;

S_s = specific storage of the porous material; and

t = time.

The MODFLOW program consists of a group of sub-routines for simulation of external stresses such as pumping and vertical recharge. Ground water flow within aquifers can be simulated as fully 3-D or quasi 3-D under confined and unconfined conditions.

MODFLOW's computer code and the governing equation have been verified (Anderson and Woessner, 1992), ensuring accurate solutions to the equations that constitute the mathematical model and accurate descriptions of ground water migration through porous

media. MODFLOW is widely used and accepted internationally because of its demonstrated capability to simulate ground water flow in complex hydrogeologic settings.

MODFLOW-SURFACT includes new flow modules that were added to MODFLOW (as intended by the authors) to enhance its ground water flow modeling capability, and computational power and stability. MODFLOW-SURFACT improves the routines for performing unconfined simulations involving desaturation/resaturation of nodes, and overcomes the numerical difficulties encountered with standard USGS versions of MODFLOW. Additional enhancements to MODFLOW-SURFACT include options for adaptive time-stepping and output control, several Preconditioned Conjugate Gradient solution packages, and a Newton-Raphson linearization package to enhance solver stability.

The partial differential equation governing 3-D transport of a solute species, k , in a variably-saturated porous medium may be written in the following form (Bear, 1979):

$$\frac{\partial}{\partial x_i} \left(D_{ij} \frac{\partial c^k}{\partial x_j} \right) - \frac{\partial}{\partial x_i} (v_i c^k) = \frac{\partial}{\partial t} (\Phi S_\alpha c^k) + \frac{\partial}{\partial t} (\rho_s c_s^k) + \lambda_\alpha^k \Phi S_\alpha c^k + \lambda_s^k \rho_s c_s^k - q c^{*k} + \Gamma^k - \lambda_\alpha^{k-1} \Phi S_\alpha c^{k-1} - \lambda_s^{k-1} \rho_s c_s^{k-1} \quad 2)$$

i or j = 1,2,3;

D_{ij} = the apparent hydrodynamic dispersion tensor;

c^k = solute concentration of component k in the active phase;

c_s^k = the concentration of component k adsorbed to the soil;

v_i = the Darcy velocity;

ϕ = the effective porosity;

S_α = the saturation of the active fluid phase;

$\lambda_\alpha^k, \lambda_s^k$ = first-order decay coefficients for component k in the active fluid phase, α and soil, s ;

q = the volumetric flow rate via sources or sinks per unit volume of the porous medium;

c^{*k} = the solute concentration of the sources or sinks; and

Γ = the mass transfer rate of component k from the active phase to the inactive phase (zero for contaminant transport in the active phase only).

Component ($k-1$) is the parent component for daughter product k when transformation products occur. The last two terms in equation 2 represent generation of component k as a result of decay of ($k-1$) in water and on soil, respectively. The active phase, α is the phase for which the flow equation is solved.

Equation 2 expresses the transport of a decaying solute in a sorbing porous medium because of advection and Fickian dispersion in the active phase. The governing equation for transport of solute in a variably-saturated porous medium reduces to the saturated transport equation when the active fluid phase, H_2O is water (w), and $S_w = 1$.

Verification of the MODFLOW-SURFACT flow code was conducted by comparison of the numerical solutions to analytical solutions, to numerical solutions from other modeling studies, and to field observations (HydroGeoLogic Inc., 2002). Flow continuity requirements are satisfied, and solute transport solutions are mass conservative.

3.2 Model Domain

The Area 29 model domain is depicted on Figure 3. The northern and eastern perimeter of the model domain (irregular-shaped) is the NBAC.

3.3 Finite Difference Grid

The finite-difference grid is portrayed on Figure 4. The grid cell size ranges from 12.5 feet to 100 feet. The smallest discretization is centered on the infiltration gallery. The small end of the range of grid cell sizes was utilized to eliminate numerical oscillation and dispersion in solute transport simulations. The 12.5-foot cell size over the infiltration gallery facilitated matching sodium concentrations in the monitoring wells closest to the gallery.

The model has 4 layers. The top layer represents the perched water system. The second layer represents the silty-clay underlying the perched system. The third and fourth layers represent the unconfined aquifer. The layer bottoms are flat, except locally for the bottom of layer one and layer two for definition of the top and bottom of the silty-clay using well log information.

The bottom of the model has an elevation of -40 feet mean sea level (ftmsl), and the ground surface elevation in Area 29 ranges from 42 to 45 feet above msl (TRC, 1996a), providing a thickness of the unconfined aquifer in Area 29 ranging from about 82 to 85 feet. The thickness of the Upper Cohansey Sand in the immediate vicinity of Area 29 is unknown due to the lack of deeper soil boring information. However, it is believed to be about 80 feet based on other deeper soil boring information located several thousand feet from Area 29 (TRC, 1996a).

3.4 Boundary Conditions

Boundary conditions may apply to steady-state simulations, or transient simulations, or both. Calibration of the flow model was performed as a steady-state simulation. Calibration of the solute transport model was performed as a transient simulation. This boundary conditions discussion indicates the applicable simulation(s) for each boundary.

The perimeter boundary conditions are shown on Figure 4. Constant head cells are used to approximate the head in the unconfined aquifer beneath the NBAC. This creek is perennial along the perimeter of the model domain, where it serves as a boundary, and is, therefore, assumed to be gaining (discharge from the aquifer to the creek) along this entire reach. The head is set to ground surface along this reach. This boundary, therefore, provides a "sink", or discharge locations to the creek, for solutes transported in the unconfined aquifer. The remainder of the constant head boundary approximates head in the unconfined aquifer based upon conceptualization of flow in the aquifer and taking into consideration ground surface elevations. Constant head cells are used for steady-state and transient simulations.

The inactive cells in the model grid are shown in black on Figure 4. These cells are designated as "no flow" cells.

Infiltration of precipitation, or natural recharge to the aquifer from incident precipitation, is also a boundary condition. This natural recharge was calibrated (in conjunction with calibration of the hydraulic conductivity as a function of calibrating transport from the infiltration gallery) to a steady-state, or average annualized rate of 8.76 inches/year. This rate represents 21.6 percent of the 30-year (1971-2000) average annual precipitation of 40.59 inches at the Atlantic City International Airport. The recharge from incident precipitation is used for steady-state and transient simulations.

Recharge of runoff from the area upslope of the low slope area surrounding the extraction wells was also calibrated. This runoff recharge rate is 6.57 inches/year. This recharge was applied to the low slope area, in addition to recharge from incident precipitation, for a total localized recharge rate of 15.33 inches/year. The recharge from runoff is used for steady-state and transient simulations.

The sprinkler discharge was applied as a recharge rate locally in the vicinity of the extraction wells (to the perched water system). The June 2008 total volumetric discharge of 139,677 gallons to the sprinklers (URS, 2008a) was used, because water levels in monitoring wells from June 2008 were used as targets for calibration of the flow model. This volumetric sprinkler discharge for the month of June 2008 was converted to a rate per unit of simulated application area of 0.0808 inches/day, and for simplicity, 100 percent is simulated as infiltrating. However, the additional recharge from incident precipitation and upslope runoff was ignored in the sprinkler application area, because evaporation and evapotranspiration reduce the net infiltration of the sprinkler water by an undetermined amount. This model simplification is permissible and essentially irrelevant, because the focus of the calibration is the unconfined aquifer (for the transport simulations). Refinement of the net recharge rate in the sprinkler area would result in a modification of the hydraulic conductivity of the perched water system to match the corresponding target heads that would have no effect on the

unconfined system due to the very low hydraulic conductivity of the clayey-silt underlying the perched water system.

The recharge from sprinkler discharge is used for steady-state and transient simulations. Although the sprinklers are not used in the winter months, this calibration sprinkler recharge rate was applied throughout the year to circumvent convergence problems in the transient transport simulations. Neither this simplification of the model, nor the use in the transport simulations of the specific rate based on the June 2008 sprinkler discharge has any significant effect on the potentiometry of the unconfined aquifer in which the sodium transport is simulated.

The infiltration gallery is simulated as a recharge boundary condition for transient simulations. The recharge from gallery discharge is simulated transiently 5 months of the year for the solute transport simulations (CEA delineation). The recharge from incident precipitation is simulated the remainder of the year. The recharge in this area goes directly to the unconfined aquifer (no perched system in this area). The average discharge for the months of November 2007 through March 2008 (URS, 2008a) was converted to a rate per unit of simulated application area of 2.38 inches/day.

The extraction wells in the perched aquifer are simulated for steady-state and transient conditions. These wells operate year around. The June 2008 total volumetric flow of 139,677 gallons from the extraction wells (URS, 2008a, b) was used, because water levels in monitoring wells from June 2008 were used as targets for calibration of the flow model. The simulated individual extraction well daily rates were based on this total monthly flow by calculating the proportions of flow among the wells according to the reported instantaneous rates (URS, 2008a).

The constant concentration boundary represented on Figure 4 generates background concentrations of sodium in ground water ($2,340 \mu\text{g/L}$) flowing into the model domain. This boundary is used for transient simulations.

Background concentrations in ground water are generally a function of ground water reactions with aquifer materials and residence times. Periodic infiltration of precipitation will cause fluctuations in the background concentrations. In order to simulate a background concentration of $2,340 \mu\text{g/L}$ sodium throughout the model domain, the recharge waters (incident precipitation and runoff) were given the background concentration. The sprinkler water discharged to the perched aquifer was also given the background concentration for model simplification (avoidance of convergence problems), rather than the effluent concentration, because the objective of the transport simulations is defining the CEA in the unconfined aquifer for discharge to the infiltration gallery. The recharge boundaries background concentrations are used for transient simulations. Initial concentrations of sodium for the transient simulations are also set at $2,340 \mu\text{g/L}$.

The simulated recharge sodium concentration for the infiltration gallery during the 5 months of the year usage is 95,129 µg/L. The background concentration of 2,340 µg/L is assigned for the remainder of the year. This boundary concentration is used in the transient simulations.

Laboratory data for the treatment plant influent and effluent concentrations from February 2004 and May 2008 through December 2008 (Appendix A) were available for determining the model infiltration gallery recharge concentration. These data indicate significant variations in the effluent concentrations and no apparent trend. The influent concentrations for 2008 are also variable and do not suggest effluent concentrations are increasing with influent concentrations. For these reasons, the average sodium concentration of effluent for 2008 (95,129 µg/L) was used for the transient simulations.

3.5 Flow Calibration

The calibrated potentiometry of the unconfined aquifer is shown on Figure 5. The head contours in the vicinity of Area 29 illustrate a slight concavity in the up-gradient direction, which is attributed to the local clayey-silt layer at the top of this aquifer. The modeling, therefore, demonstrates the presence of this stratum, the perched water, and the stresses in the perched water have little influence on the flow pattern in the unconfined aquifer, which will be further demonstrated with the solute transport simulations results.

A magnified view of the potentiometry at Area 29 is shown on Figure 6, which includes calibration errors at the monitoring wells completed in the unconfined aquifer. The calibration errors are in the range of hundredths to tenths of feet, and the largest error is 0.13 foot (1.5 inches). The relatively small number of calibration targets and the insignificant errors obviate the calculation of calibration statistics. Calibration errors for the perched water system (not shown) are also extremely small (generally < 0.2 ft, with the maximum 0.53 ft very close to an extraction well, which is attributed to grid discretization limitations). These results demonstrate a good understanding of the hydrogeology of Area 29, evidenced by the combined calibration of both systems.

The calibrated uniform hydraulic conductivity of the unconfined aquifer is 20 feet/day (7.1×10^{-3} cm/sec). The horizontal/vertical anisotropy is 10/1. The calibrated hydraulic conductivity is about twice the upper end of the range of 10.6 feet/day reported for aquifer testing analysis (TRC, 1996a). This deviation is reasonable, given the error introduced in analysis by partially penetrating wells, curve-fitting error and/or deviations of the data from theoretical models, aquifer thickness uncertainty, and other error associated with the simplifying assumptions of the analytical solutions.

The calibration of the unconfined aquifer hydraulic conductivity was performed using summer water levels (June 2008), which were not elevated in the monitoring wells around the infiltration gallery (used during winter months). The hydraulic conductivity was optimized (increased from the initially calibrated 10 feet/day) with feedback from solute transport simulations. Mounding of ground water and hydraulic gradients at the infiltration gallery were too large with values of hydraulic conductivity lower than 20 feet/day. This mounding resulted in simulating elevated concentrations of sodium in the naturally up-gradient wells 29-MW16S and 29-MW17S (these wells have only very recently begun to exhibit increases in sodium concentrations). The increase in hydraulic conductivity required an increase in the natural recharge rate from precipitation such that the steady-state flow calibration with 20 feet/day and an average annualized recharge rate of 8.76 inches/year match the summer water levels (Figure 6). Furthermore, the resulting increased rate of ground water flow through the aquifer generated a simulated asymmetric plume of sodium (See Figure 8), which matches the observed increasing sodium concentrations in 29-MW18S and 29-MW19S as 29-MW16S and 29-MW17S sodium concentrations remained at or around background. The post-discharge ground water flow drives solute away from 29-MW16S and 29-MW17S, keeping concentrations low. An example of simulated mounding of the water table at the infiltration gallery after 5 months of infiltration with the calibrated model is shown on Figure 7.

The calibrated hydraulic conductivity of the clayey-silt is 0.008 feet/day (2.8×10^{-6} cm/sec). The horizontal/vertical anisotropy is 100/1. The low conductivity of the clayey-silt layer and the absence of a seepage or spillover effect of the perched system on the contours of the unconfined aquifer confirm that the perched and unconfined systems have little or no interaction.

The calibrated hydraulic conductivity of the perched system is generally 2 feet/day (7.1×10^{-4} cm/sec), with local areas of 1.3 feet/day (4.6×10^{-4} cm/sec) and 30 feet/day (1.1×10^{-2} cm/sec). The horizontal/vertical anisotropy is 10/1. These values of hydraulic conductivity are well within the range of reported values (TRC, 1996a), and the modeled variations are consistent with the observed heterogeneity during drilling (TRC, 1996b) and the apparent heterogeneity from the wide range of hydraulic conductivity values from analyses of data from multiple observation wells for a single pumping test. The hydraulic conductivity values of the perched water system were also calibrated with summer water levels (June 2008), when sprinkler discharge and extraction well discharge were occurring and simulated simultaneously.

The specific yield of the unconfined aquifer is set to a uniform value of 0.35 for fairly clean sand (Fetter, 1994; Kresic, 1997). The specific yield of the clayey-silt is set to 0.01. The specific yield of the perched aquifer sediment ranges from 0.20 (silty sand) to 0.30 (cleaner sand).

3.6 Solute Transport Calibration

The calibrated sodium concentrations from infiltration gallery discharge are shown on Figure 8. This simulated concentration distribution represents 3 years of transport since gallery use began in November 2004. The simulated concentrations represent a good match to observed values in late 2007 and early 2008 (Appendix B). Simulated concentrations at monitoring wells 29-MW16S and 29-MW17S are only very slightly above background. The monitoring data for these wells generally indicate background concentrations during this time period, with possible minor temporary, pulse increases. The data for 29-MW18S indicate more elevated concentration pulses, decreasing toward background levels. The higher simulated concentrations at 29-MW18S than at 29-MW16S and 29-MW17S are consistent with these data. The simulated concentration at 29-MW19S is consistent with observed concentrations at about 3 years. This well has exhibited the greatest and most consistent increase in sodium concentrations. The calibrated transport model reproduces this general response (asymmetric plume distribution), as well as the specific concentrations at each of the monitoring wells.

The solute transport calibration is a quasi-calibration. Not only did the usage of the gallery vary from year to year (Appendix C), but the effluent concentrations were also extremely variable, as shown by the data in Appendix A. Not knowing the effluent concentrations throughout the calibration period, the calibration would be no better by simulating the actual volumes of discharge water from month to month (5 months were simulated each year, and there were some years with greater usage). Notwithstanding these limitations, the model is a good tool for estimating CEA boundaries given the uncertainties of future gallery usage and effluent concentrations.

The additional model parameters for solute transport are effective porosity, dispersivity, and retardation. Constraints on these parameters are not as good as hydraulic parameters, and they are typically set or calibrated with professional judgment and literature guidance.

The effective porosity utilized for the unconfined aquifer is 35% (Kresic, 1997). This value was specified in accordance with the modeled specific yield of fairly clean sand.

Dispersion spreads the plume, causing it to advance at a rate greater than the seepage velocity, but the mixing slows the rate of increase in concentration. The dispersivity of the unconfined aquifer was calibrated by trial and error. Longitudinal dispersivity is 5 feet, horizontal transverse dispersivity is 0.5 feet, and vertical transverse dispersivity is 0.05 feet. These values are on the low end of the range of literature values for sand (Gelhar et al., 1992), which is consistent with the short transport distance and the scale dependency of dispersivity on distance (Schulze-Makuch, 2005). The order of magnitude relationships among the various dispersivity values is a commonly accepted modeling procedure rooted in dispersivity studies (e.g., Gelhar et al., 1992).

Mild retardation was applied as a calibration parameter with the justification that sodium is not entirely inert (a conservative tracer) during ground water transport, and to account for the observed very slow increase in concentrations. Sorption and cation exchange can slow and attenuate sodium in ground water (Hem, 1992).

Retardation is a factor that slows the solute transport velocity relative to the seepage velocity, defined as the ratio of V_s/V_r (V_s = seepage velocity, V_r = retarded velocity), or as $1 + \frac{\theta_b K_d}{\theta}$ (θ_b = bulk dry density, K_d = distribution coefficient, θ = effective porosity). Retardation also slows the dispersive transport. A retardation factor of 1.4 was applied to the unconfined aquifer, assuming a sand bulk dry density of 1.6 g/cm^3 and the effective porosity of 0.35. The distribution coefficient was calibrated to a value of 0.087 ml/g.

4.0 PREDICTIONS (CEA DELINEATIONS)

Figures 9 - 11 depict the outlines of Area 29 CEAs for 10, 20, and 30 years of sodium transport, respectively. The 2,340 µg/L outlines represent the extents to which the gallery infiltration would raise sodium concentrations in ground water above the simulated background concentration of 2,340 µg/L.

The predictive simulation results represent times of transport from February 2009. The initial concentrations of these simulations are the simulated concentrations after 4 years of transport (1 year past the calibration concentrations, Figure 8) from the beginning of gallery usage (i.e., the 30 year CEA represents 34 years of gallery usage). It is noteworthy that the most recent available results of sodium analyses for monitoring wells 29-MW16S through 29-MW19S (August, 2008; Appendix D) indicate that concentrations are distinctly higher than June 2008 concentrations (Appendix B) in all wells but 29-MW16S. This upward trend is consistent with the Year 4 initial concentrations (February 2009) for the predictive simulations.

The transport model simulation was extended to a conservative aquifer pump and treat clean-up period of 30 years. However, FAA is working toward implementing expedited site remediation using innovative technologies at Area 29 (and their other ground water cleanup sites) in the upcoming future.

5.0 CONCLUSIONS

Infiltration gallery usage for an average 5 months each year over the next 30 years is projected to generate an east-west oriented plume of sodium above the background concentration (2,340 µg/L) in the unconfined aquifer that approaches the NBAC area located east of Area 29. The plume migration will be unaffected by the remediation systems in the perched aquifer and the underlying aquitard protruding into the upper part of the unconfined aquifer. The sodium transport velocity is mildly retarded relative to the seepage velocity.

Transport of other metals occurs at a lower velocity than sodium. The CEA boundaries defined by sodium transport simulations, therefore, encompass elevated concentrations of other metals that are artificially elevated above background concentrations due to treatment plant processes (e.g., manganese, potassium, etc).

6.0 RECOMMENDATIONS

Monitoring wells located down-gradient of the Area 29 point of compliance wells (i.e., 29-MW16S, 29-MW17S, 29-MW18S and 29-MW19S) and screened within the unconfined aquifer should be sampled on an annual basis for TAL metals to provide "ground truthing" for the transport of sodium in the ground water. These monitoring wells include: 29-MW1S, 29-MW4S, 29-MW5S, 29-MW6S and 29-MW10S. If sodium concentrations are detected above background in the monitoring wells located furthest down-gradient (29-MW5S and/or 29-MW6S), new point-of-compliance wells screened within the unconfined aquifer should be installed further down-gradient to track the migration of sodium in the unconfined aquifer.

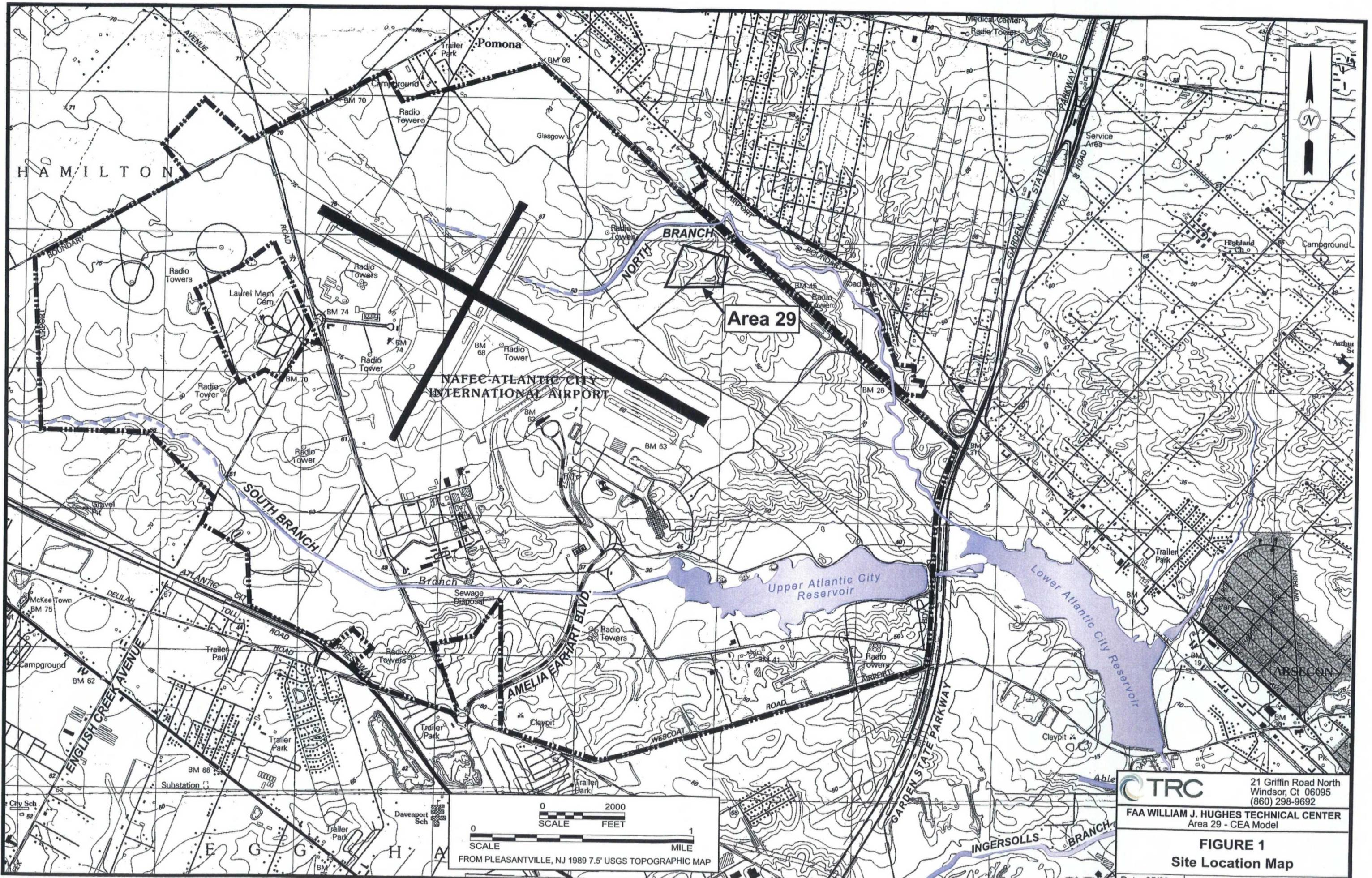
7.0 REFERENCES

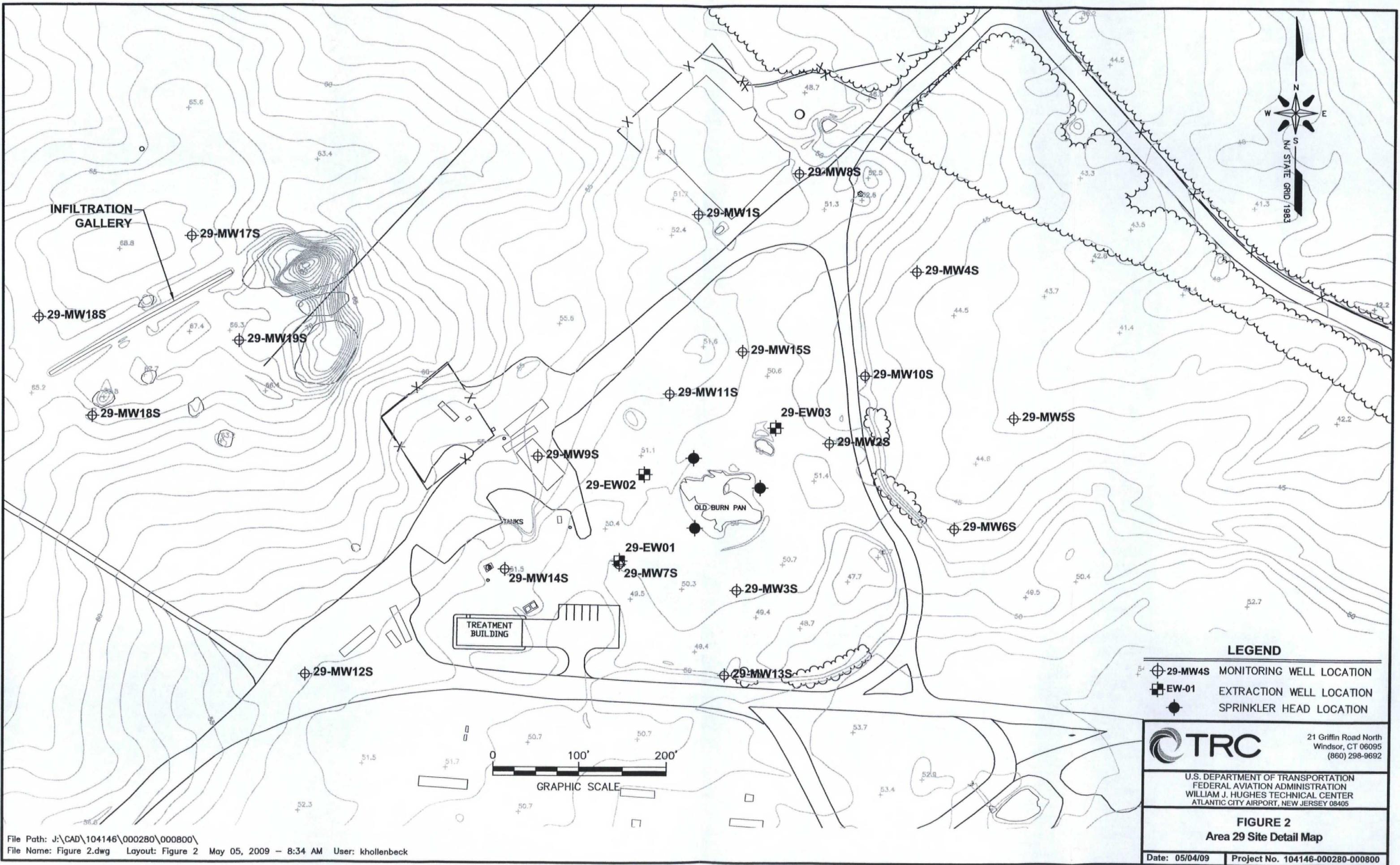
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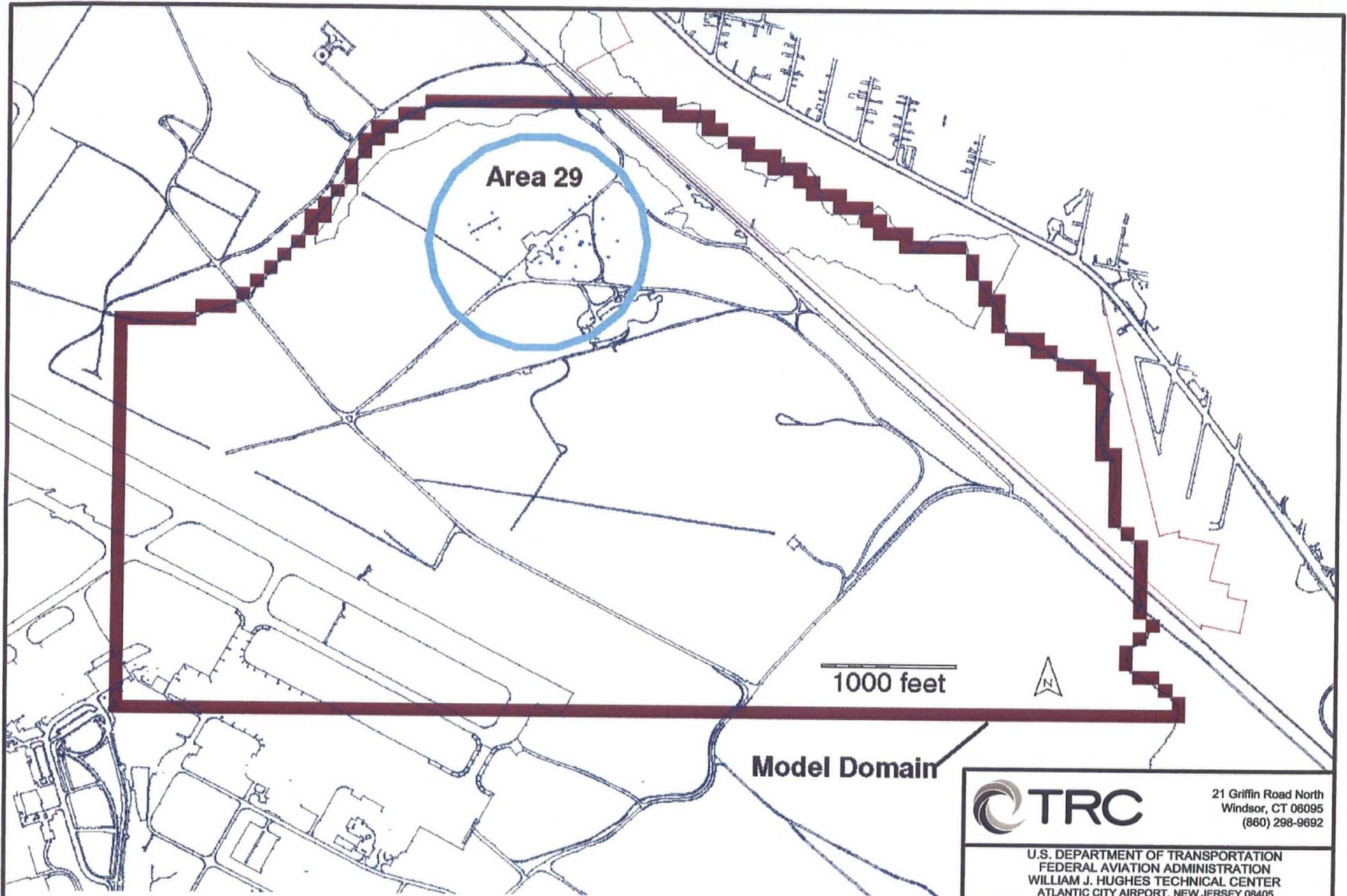
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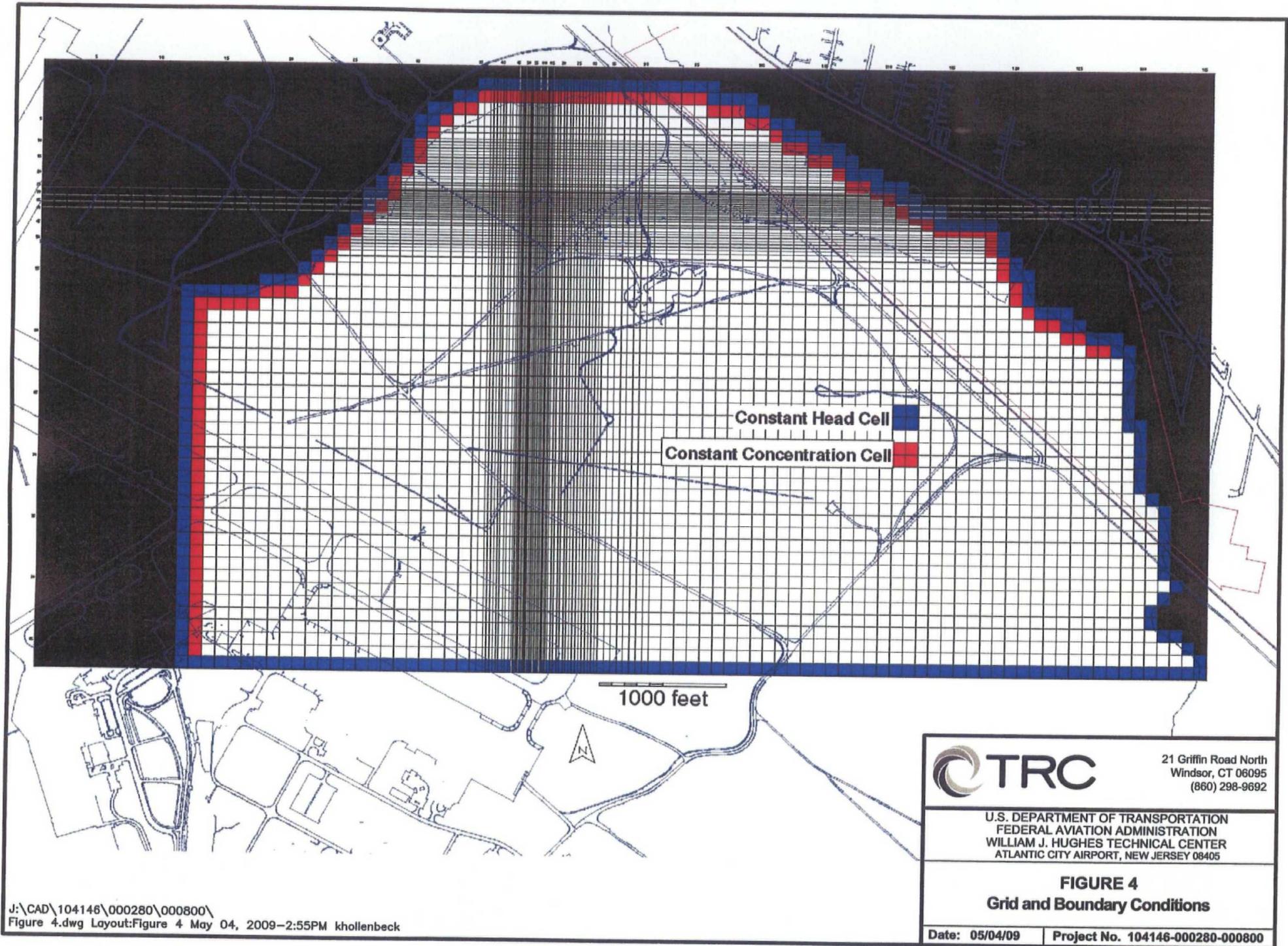
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

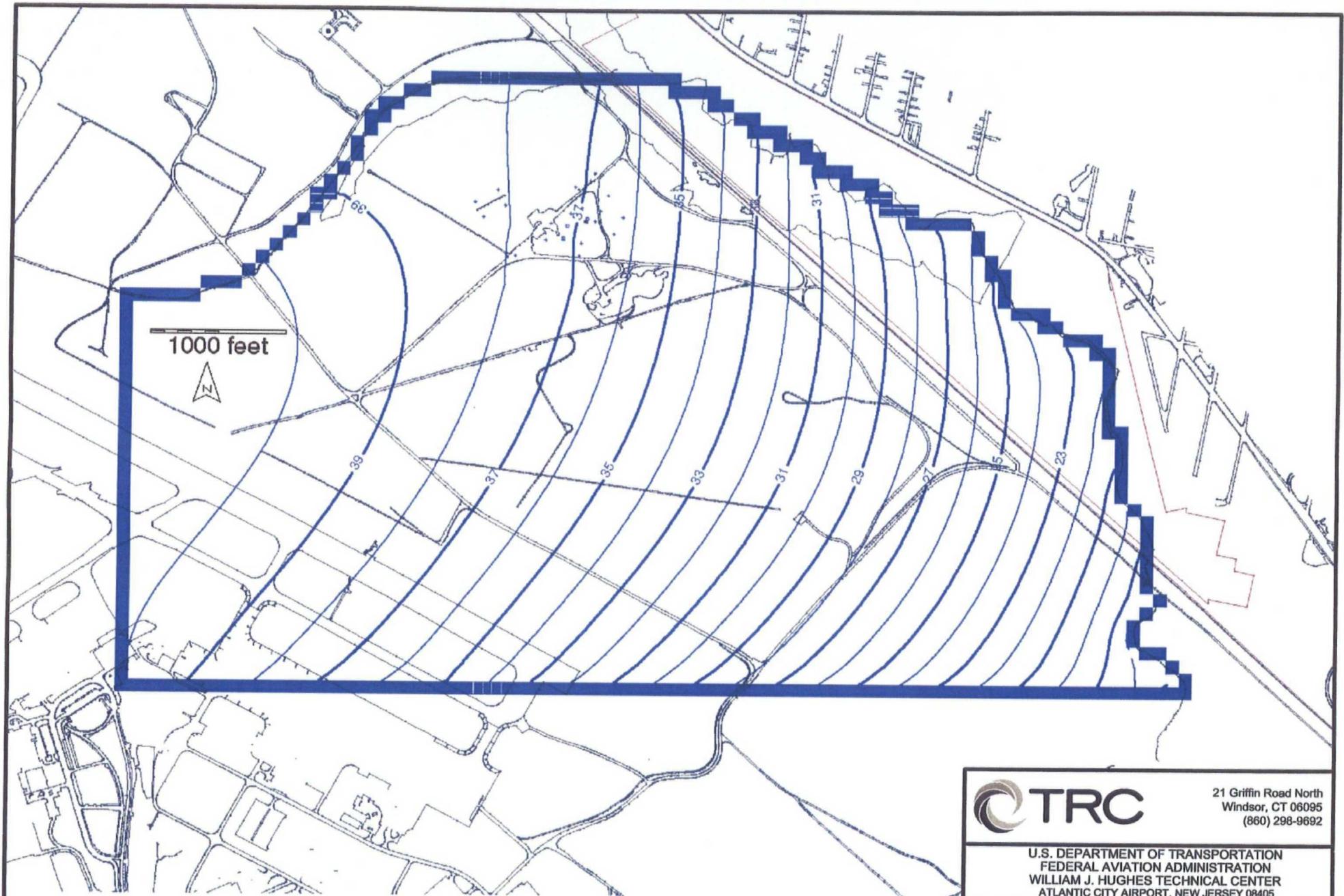
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FIGURE 3
CEA Model Domain

Date: 05/04/09

Project No. 104146-000280-000800



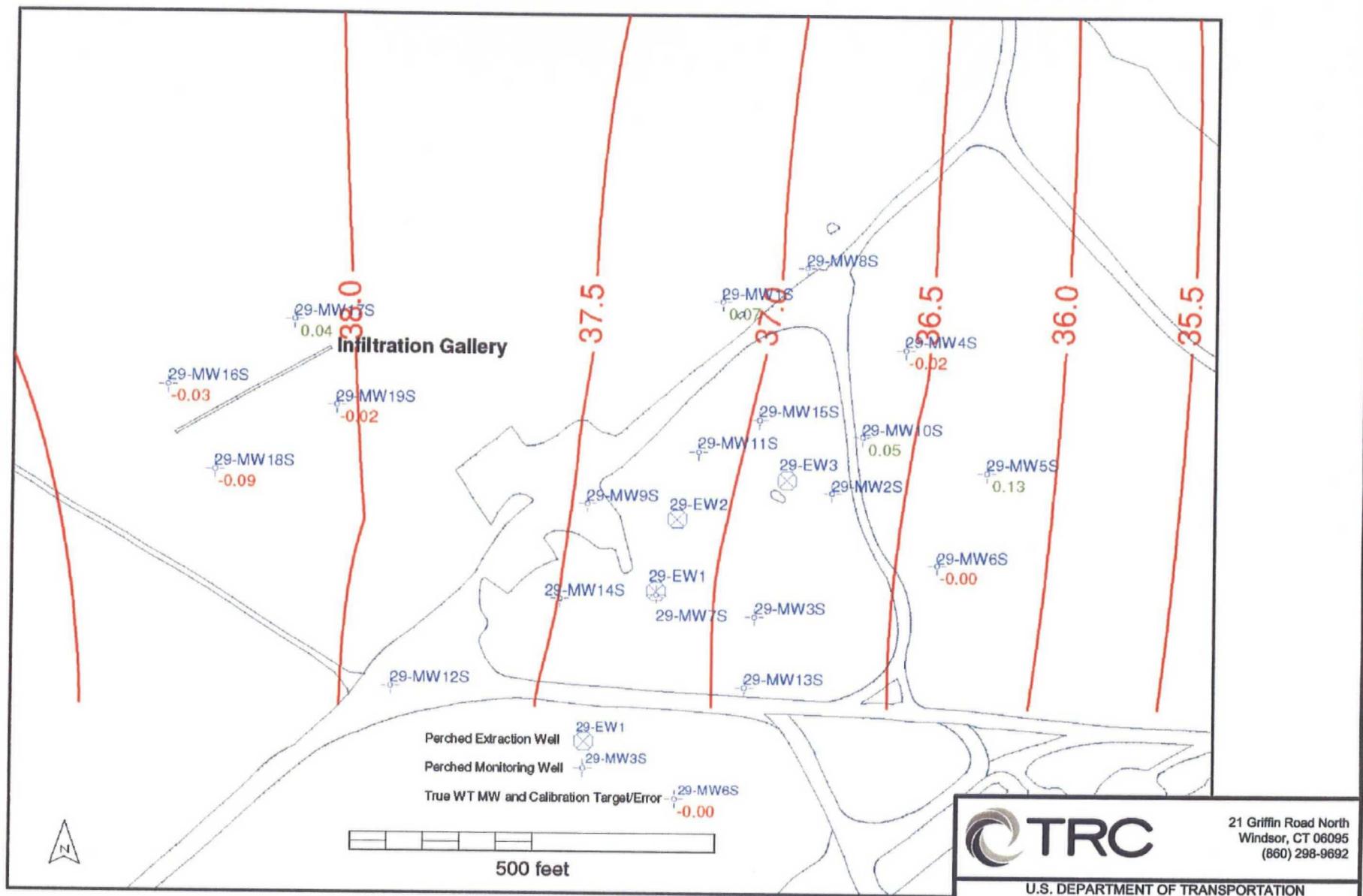


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FIGURE 5
Calibrated Unconfined Aquifer Potentiometry

Date: 05/04/09 Project No. 104146-000280-000800



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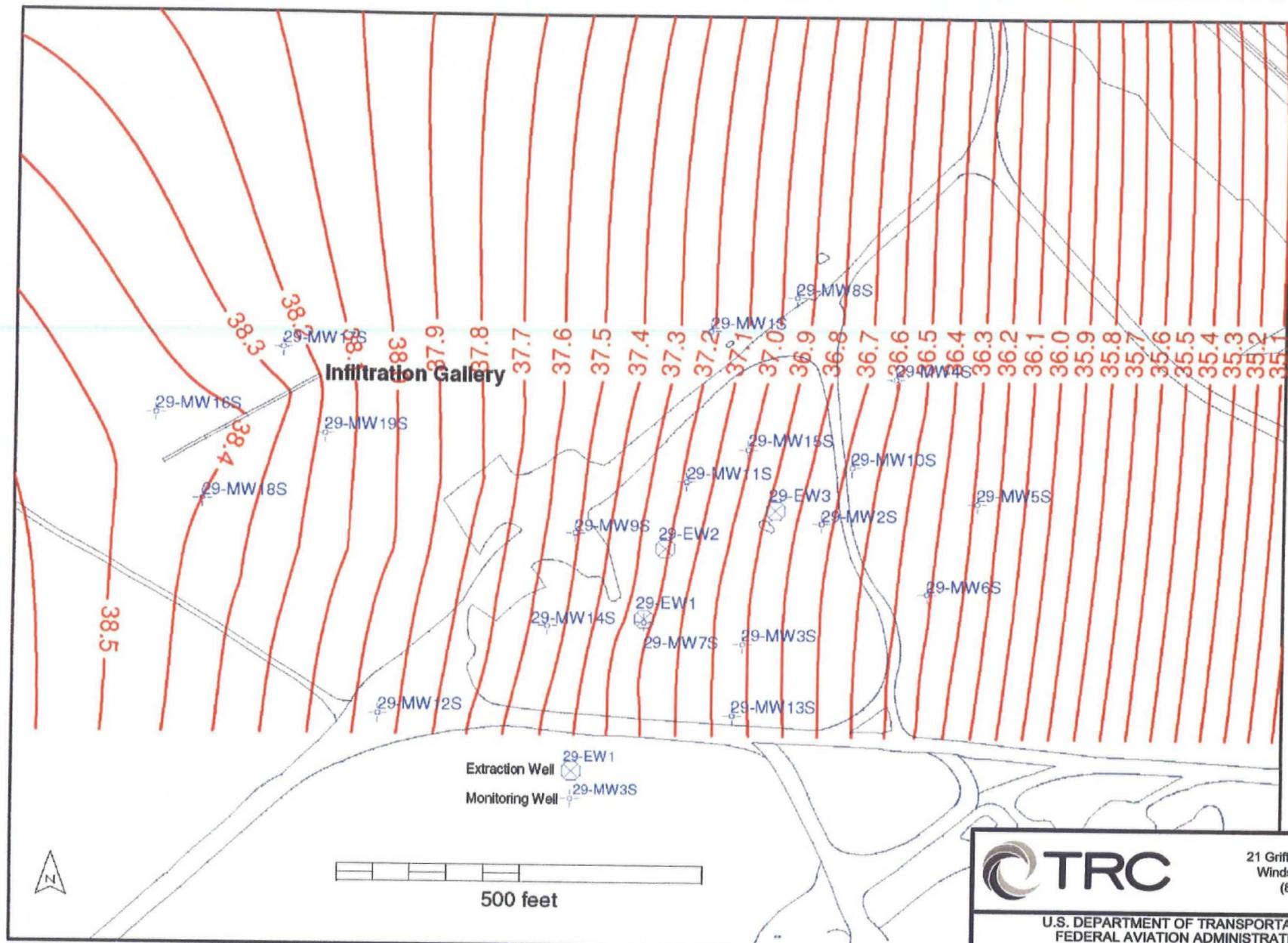


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FIGURE 6
Unconfined Aquifer Head Calibration Errors

Date: 05/04/09 Project No. 104146-000280-000800

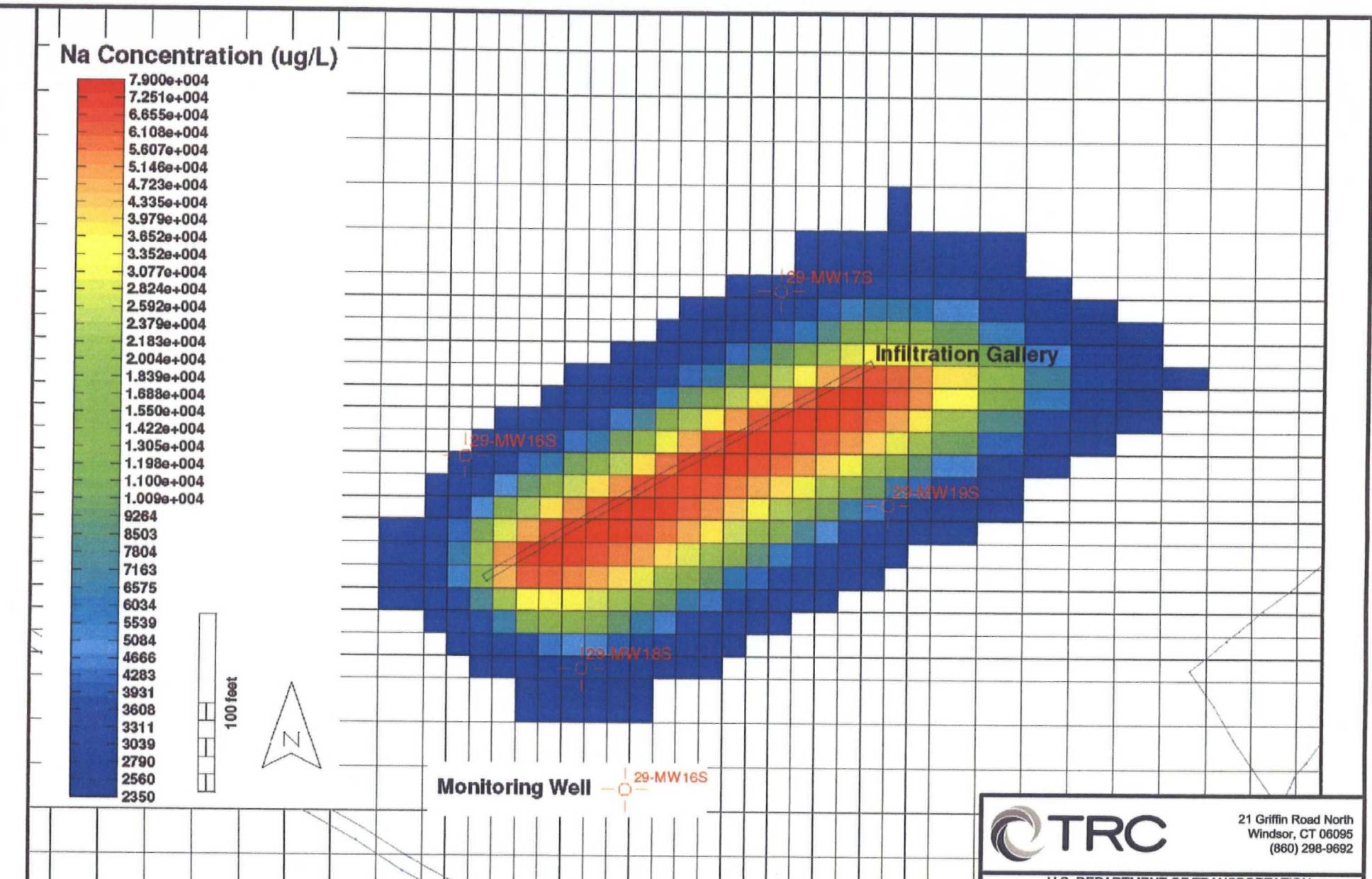


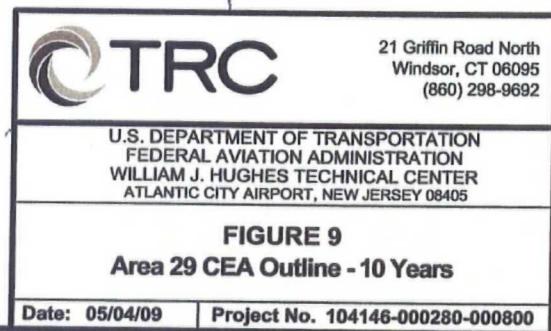
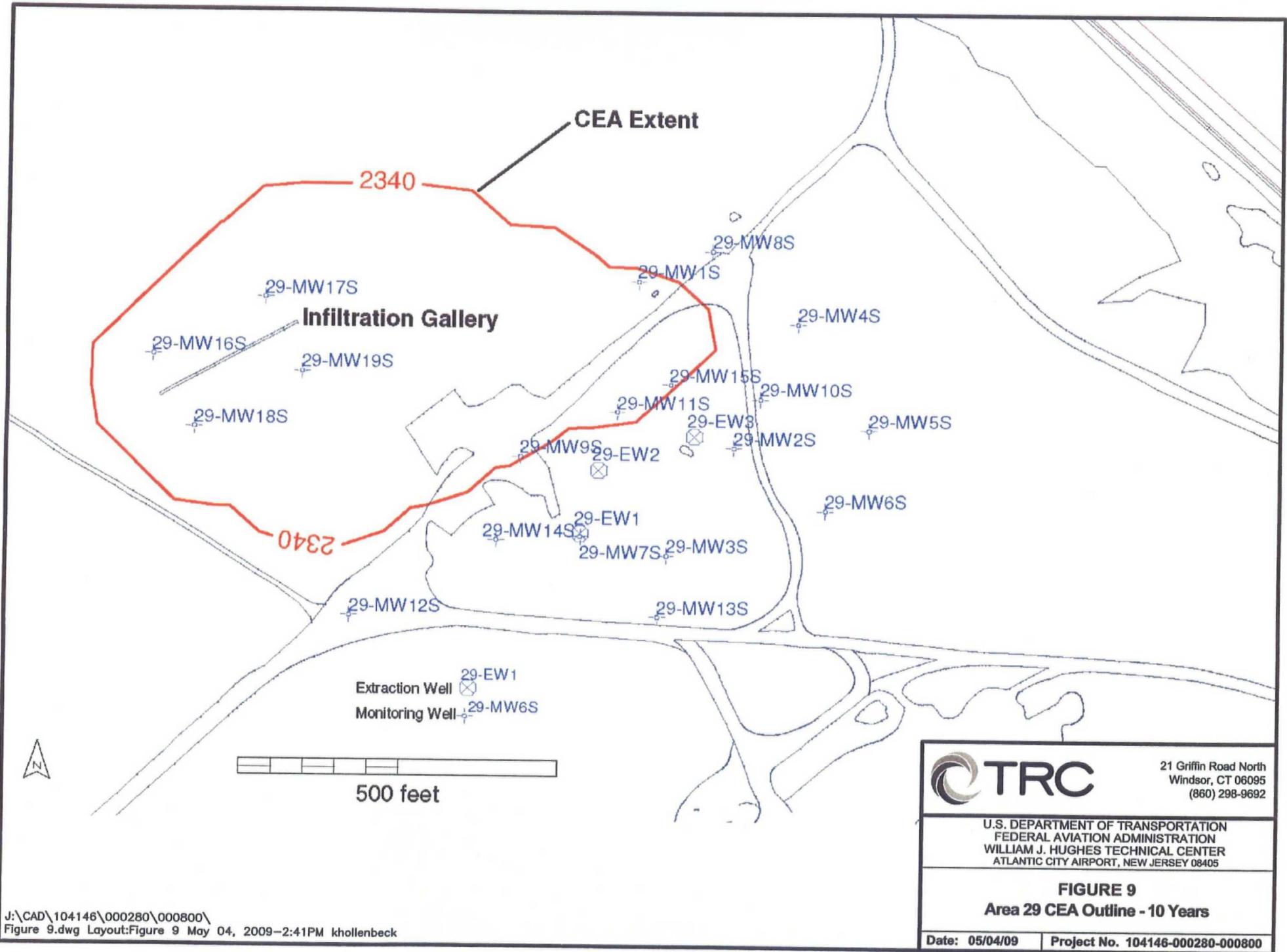
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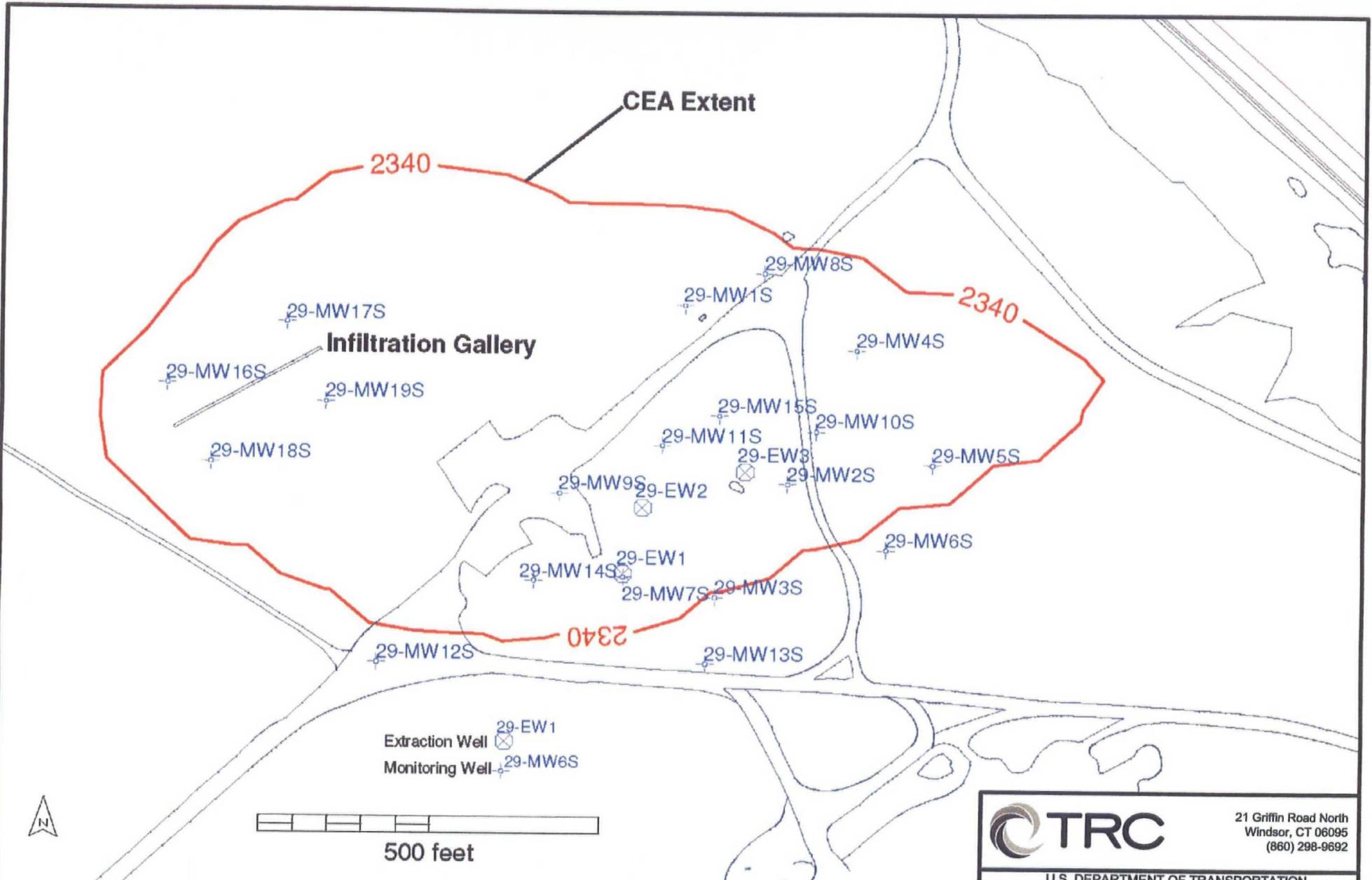
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FIGURE 7
Infiltration Gallery Ground Water Mounding

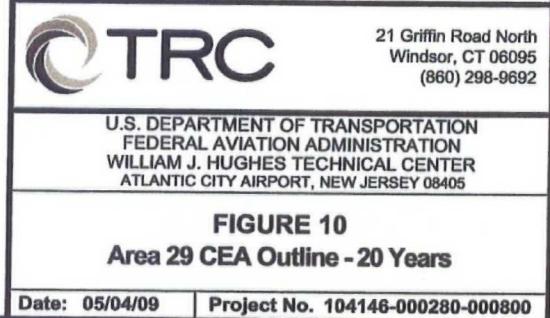
Date: 05/04/09 | Project No. 104146-000280-000800

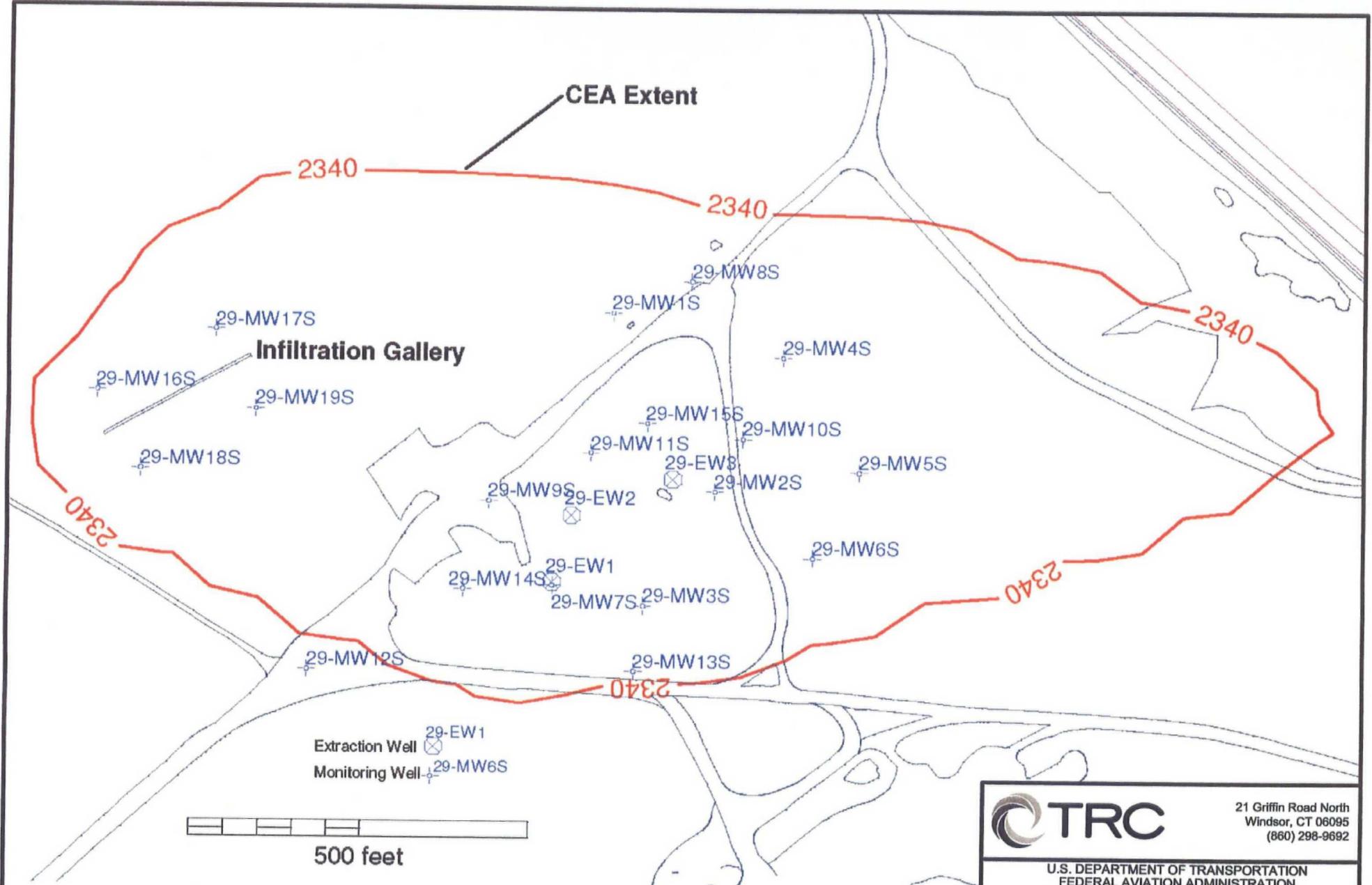






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Figure 11.dwg Layout:Figure 11 May 04, 2009—2:37PM khollenbeck



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FIGURE 11
Area 29 CEA Outline - 30 Years

Date: 05/04/09 | Project No. 104146-000280-000800

APPENDIX A

AREA 29 TREATMENT PLANT INFLUENT AND EFFLUENT CONCENTRATIONS

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT

Client: URS Construction Services

Project: AREA 29 MONTHLY - 41554969.991330

Lab Case No.: E08-05218

PARAMETER(Units)	Lab ID:	05218-001	05218-002	05218-003	05218-004					
	Client ID:	29-PS1-84	29-PS6-84	29-PS3-84	29-DUP050708-84					
	Matrix:	Aqueous 5/7/08	Aqueous 5/7/08	Aqueous 5/7/08	Aqueous 5/7/08					
Sampled Date	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	
Volatiles (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
Chloromethane	ND	0.330	ND	0.330	~	~	ND	0.330	ND	0.330
Vinyl chloride	ND	0.310	ND	0.310	~	~	ND	0.310	ND	0.310
Bromomethane	ND	0.220	ND	0.220	~	~	ND	0.220	ND	0.220
Chloroethane	11.1	0.330	1.20	0.330	~	~	1.23	0.330	ND	0.330
Trichlorofluoromethane	ND	0.550	ND	0.550	~	~	ND	0.550	ND	0.550
Acrolein	ND	3.87	ND	3.87	~	~	ND	3.87	ND	3.87
1,1-Dichloroethene	0.846	0.400	ND	0.400	~	~	ND	0.400	ND	0.400
Methylene chloride	ND	1.98	ND	1.98	~	~	ND	1.98	ND	1.98
Acrylonitrile	ND	1.86	ND	1.86	~	~	ND	1.86	ND	1.86
trans-1,2-Dichloroethene	ND	0.350	ND	0.350	~	~	ND	0.350	ND	0.350
1,1-Dichloroethane	0.735	0.330	ND	0.330	~	~	ND	0.330	ND	0.330
Chloroform	ND	0.140	ND	0.140	~	~	ND	0.140	ND	0.140
1,1,1-Trichloroethane	ND	0.200	ND	0.200	~	~	ND	0.200	ND	0.200
Carbon tetrachloride	ND	0.160	ND	0.160	~	~	ND	0.160	ND	0.160
1,2-Dichloroethane (EDC)	ND	0.230	ND	0.230	~	~	ND	0.230	ND	0.230
Benzene	42.7	0.180	ND	0.180	~	~	ND	0.180	ND	0.180
Trichloroethene	ND	0.340	ND	0.340	~	~	ND	0.340	ND	0.340
1,2-Dichloropropane	ND	0.210	ND	0.210	~	~	ND	0.210	ND	0.210
Bromodichloromethane	ND	0.210	ND	0.210	~	~	ND	0.210	ND	0.210
2-Chloroethyl vinyl ether	ND	0.240	ND	0.240	~	~	ND	0.240	ND	0.240
cis-1,3-Dichloropropene	ND	0.220	ND	0.220	~	~	ND	0.220	ND	0.220
Toluene	13.4	0.160	ND	0.160	~	~	ND	0.160	ND	0.160
trans-1,3-Dichloropropene	ND	0.160	ND	0.160	~	~	ND	0.160	ND	0.160
1,1,2-Trichloroethane	ND	0.280	ND	0.280	~	~	ND	0.280	ND	0.280
Tetrachloroethene	ND	0.310	ND	0.310	~	~	ND	0.310	ND	0.310
Dibromochloromethane	ND	0.180	ND	0.180	~	~	ND	0.180	ND	0.180
Chlorobenzene	ND	0.170	ND	0.170	~	~	ND	0.170	ND	0.170
Ethylbenzene	59.2	0.220	ND	0.220	~	~	ND	0.220	ND	0.220
Total Xylenes	117	0.630	ND	0.630	~	~	ND	0.630	ND	0.630
Bromoform	ND	0.360	ND	0.360	~	~	ND	0.360	ND	0.360
1,1,2,2-Tetrachloroethane	ND	0.350	ND	0.350	~	~	ND	0.350	ND	0.350
1,3-Dichlorobenzene	ND	0.210	ND	0.210	~	~	ND	0.210	ND	0.210
1,4-Dichlorobenzene	ND	0.180	ND	0.180	~	~	ND	0.180	ND	0.180
1,2-Dichlorobenzene	ND	0.210	ND	0.210	~	~	ND	0.210	ND	0.210
TOTAL VO's:	244.98	1.2			1.23					
Semivolatiles - BNA (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
N-Nitrosodimethylamine	ND	0.460	ND	0.460	~	~	ND	0.460	ND	0.460
Phenol	ND	0.230	ND	0.230	~	~	ND	0.230	ND	0.230
Aniline	ND	0.540	ND	0.540	~	~	ND	0.540	ND	0.540
Bis(2-chloroethyl) ether	ND	0.220	ND	0.220	~	~	ND	0.220	ND	0.220
2-Chlorophenol	ND	0.300	ND	0.300	~	~	ND	0.300	ND	0.300
Benzyl alcohol	ND	0.410	ND	0.410	~	~	ND	0.410	ND	0.410
2-Methylphenol	ND	0.260	ND	0.260	~	~	ND	0.260	ND	0.260
Bis(2-chloroisopropyl) ether	ND	0.180	ND	0.180	~	~	ND	0.180	ND	0.180
4-Methylphenol	ND	0.280	ND	0.280	~	~	ND	0.280	ND	0.280
N-Nitrosodi-n-propylamine	ND	0.210	ND	0.210	~	~	ND	0.210	ND	0.210
Hexachloroethane	ND	0.290	ND	0.290	~	~	ND	0.290	ND	0.290
Nitrobenzene	ND	0.230	ND	0.230	~	~	ND	0.230	ND	0.230

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT

Client: URS Construction Services

Project: AREA 29 MONTHLY - 41554969.991330

Lab Case No.: E08-05218

PARAMETER(Units)	Lab ID: Client ID: Matrix: Sampled Date	05218-001 29-PS1-84 Aqueous 5/7/08	05218-002 29-PS6-84 Aqueous 5/7/08	05218-003 29-PS3-84 Aqueous 5/7/08	05218-004 29-DUP050708-84 Aqueous 5/7/08
		Conc Q MDL	Conc Q MDL	Conc Q MDL	Conc Q MDL
Semivolatiles - BNA (Units)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)
Isophorone	ND	0.230	ND	0.230	~
2-Nitrophenol	ND	0.570	ND	0.570	~
2,4+2,5-Dimethylphenol	ND	0.500	ND	0.500	~
Bis(2-chloroethoxy) methane	ND	0.210	ND	0.210	~
Benzoic acid	ND	0.360	ND	0.360	~
2,4-Dichlorophenol	ND	0.300	ND	0.300	~
1,2,4-Trichlorobenzene	ND	0.220	ND	0.220	~
Naphthalene	16.0	0.134	ND	0.134	~
4-Chloroaniline	ND	0.680	ND	0.680	~
Hexachlorobutadiene	ND	0.460	ND	0.460	~
4-Chloro-3-methylphenol	ND	0.530	ND	0.530	~
2-Methylnaphthalene	7.85	0.188	ND	0.188	~
Hexachlorocyclopentadiene	ND	0.150	ND	0.150	~
2,4,6-Trichlorophenol	ND	0.250	ND	0.250	~
2,4,5-Trichlorophenol	ND	0.320	ND	0.320	~
2-Chloronaphthalene	ND	0.140	ND	0.140	~
2-Nitroaniline	ND	0.280	ND	0.280	~
Dimethyl phthalate	ND	0.230	ND	0.230	~
2,6-Dinitrotoluene	ND	0.340	ND	0.340	~
Acenaphthylene	ND	0.146	ND	0.146	~
3-Nitroaniline	ND	0.210	ND	0.210	~
Acenaphthene	ND	0.206	ND	0.206	~
2,4-Dinitrophenol	ND	0.330	ND	0.330	~
4-Nitrophenol	ND	0.400	ND	0.400	~
2,4-Dinitrotoluene	ND	0.340	ND	0.340	~
Dibenzofuran	ND	0.170	ND	0.170	~
Diethyl phthalate	1.09	0.190	ND	0.190	~
Fluorene	ND	0.188	ND	0.188	~
4-Chlorophenyl phenyl ether	ND	0.260	ND	0.260	~
4-Nitroaniline	ND	0.530	ND	0.530	~
4,6-Dinitro-2-methylphenol	ND	0.150	ND	0.150	~
N-Nitrosodiphenylamine	ND	0.250	ND	0.250	~
1,2-Diphenylhydrazine	ND	0.130	ND	0.130	~
4-Bromophenyl phenyl ether	ND	0.290	ND	0.290	~
Hexachlorobenzene	ND	0.210	ND	0.210	~
Pentachlorophenol	ND	0.240	ND	0.240	~
Phenanthrene	ND	0.200	ND	0.200	~
Anthracene	ND	0.091	ND	0.091	~
Carbazole	ND	0.110	ND	0.110	~
Di-n-butyl phthalate	ND	0.100	ND	0.100	~
Fluoranthene	ND	0.222	ND	0.222	~
Benzidine	ND	0.320	ND	0.320	~
Pyrene	ND	0.176	ND	0.176	~
3,3'-Dimethylbenzidine	ND	0.210	ND	0.210	~
Butyl benzyl phthalate	ND	0.280	ND	0.280	~
3,3'-Dichlorobenzidine	ND	0.200	ND	0.200	~
Benzo[a]anthracene	ND	0.300	ND	0.300	~
Chrysene	ND	0.117	ND	0.117	~

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

SUMMARY REPORT

INTEGRATED ANALYTICAL LABORATORIES, LLC.

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		Conc Q MDL	Conc Q MDL	Conc Q MDL	Conc Q MDL
Semivolatiles - BNA (Units)		(ug/L-ppb)	(ug/L-ppb)		(ug/L-ppb)
Bis(2-ethylhexyl) phthalate	0.796	0.220	ND 0.220	~ ~	ND 0.220
Di-n-octyl phthalate	ND	0.340	ND 0.340	~ ~	ND 0.340
Benzo[b]fluoranthene	ND	0.250	ND 0.250	~ ~	ND 0.250
Benzo[k]fluoranthene	ND	0.380	ND 0.380	~ ~	ND 0.380
Benzo[a]pyrene	ND	0.250	ND 0.250	~ ~	ND 0.250
Indeno[1,2,3-cd]pyrene	ND	0.190	ND 0.190	~ ~	ND 0.190
Dibenz[a,h]anthracene	ND	0.290	ND 0.290	~ ~	ND 0.290
Benzo[g,h,i]perylene	ND	0.215	ND 0.215	~ ~	ND 0.215
TOTAL BNA'S:	25.7	ND			ND
PCB's (Units)		(ug/L-ppb)	(ug/L-ppb)		(ug/L-ppb)
Aroclor-1016	ND	0.020	ND 0.020	~ ~	ND 0.020
Aroclor-1221	ND	0.020	ND 0.020	~ ~	ND 0.020
Aroclor-1232	ND	0.020	ND 0.020	~ ~	ND 0.020
Aroclor-1242	ND	0.020	ND 0.020	~ ~	ND 0.020
Aroclor-1248	ND	0.020	ND 0.020	~ ~	ND 0.020
Aroclor-1254	ND	0.020	ND 0.020	~ ~	ND 0.020
Aroclor-1260	ND	0.020	ND 0.020	~ ~	ND 0.020
Metals (Units)		(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)
Aluminum	ND	40.0	ND 40.0	ND 40.0	ND 40.0
Antimony	ND	4.00	ND 4.00	ND 4.00	ND 4.00
Arsenic	3.24	2.00	ND 2.00	ND 2.00	ND 2.00
Barium	62.2	40.0	ND 40.0	ND 40.0	ND 40.0
Beryllium	ND	1.00	ND 1.00	ND 1.00	ND 1.00
Cadmium	ND	1.00	ND 1.00	ND 1.00	ND 1.00
Calcium	13500	200	3920 200	11700 200	3940 200
Chromium	ND	8.00	ND 8.00	ND 8.00	ND 8.00
Cobalt	ND	8.00	ND 8.00	ND 8.00	ND 8.00
Copper	ND	8.00	ND 8.00	ND 8.00	ND 8.00
Iron	26000	100	ND 100	606 100	ND 100
Lead	ND	2.00	ND 2.00	ND 2.00	ND 2.00
Magnesium	2510	200	817 200	2670 200	832 200
Manganese	422	4.00	17.6 4.00	90.9 4.00	18.3 4.00
Mercury	ND	0.500	ND 0.500	ND 0.500	ND 0.500
Nickel	ND	4.00	ND 4.00	ND 4.00	ND 4.00
Potassium	3850	200	1280 200	4010 200	1330 200
Selenium	ND	8.00	ND 8.00	ND 8.00	ND 8.00
Silver	ND	2.00	ND 2.00	ND 2.00	ND 2.00
Sodium	29200	400	31700 400	106000 400	32900 400
Thallium	ND	0.400	ND 0.400	ND 0.400	ND 0.400
Vanadium	ND	8.00	ND 8.00	ND 8.00	ND 8.00
Zinc	11.0	8.00	ND 8.00	ND 8.00	13.6 8.00
General Analytical (Units)					
Field Conductivity	0.330	NA	0.551 NA	~ ~	~ ~
Field DO	4.72	NA	2.41 NA	~ ~	~ ~
Field Temperature(°C)	13.43	NA	19.01 NA	~ ~	~ ~
Field pH(S.U.)	6.3	NA	7.34 NA	~ ~	~ ~
Flow(S.U.)	3.3	NA	0.0 NA	~ ~	~ ~
Turbidity(S.U.)	0	NA	0 NA	~ ~	~ ~
ORP(S.U.)	-60	NA	194 NA	~ ~	~ ~

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

SUMMARY REPORT

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY 41554977.029
Lab Case No.: E08-06213

PARAMETER(Units)	Lab ID:	06213-001	06213-002	06213-003	06213-004	
	Client ID:	29-PS1-85	29-PS6-85	29-PS3-85	29-DUP060208-85	
	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous	
	Sampled Date	6/2/08	6/2/08	6/2/08	6/2/08	
Conc	Q	MDL	Conc	Q	MDL	
Volatiles (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
Chloromethane	ND	0.720	ND	0.360	~	~
Vinyl chloride	ND	0.840	ND	0.420	~	~
Bromomethane	ND	0.560	ND	0.280	~	~
Chloroethane	12.8	0.640	1.54	0.320	~	~
Trichlorofluoromethane	ND	1.10	ND	0.550	~	~
Acrolein	ND	4.64	ND	2.32	~	~
1,1-Dichloroethene	ND	0.920	ND	0.460	~	~
Methylene chloride	ND	3.98	ND	1.99	~	~
Acrylonitrile	ND	1.42	ND	0.710	~	~
trans-1,2-Dichloroethene	ND	0.660	ND	0.330	~	~
1,1-Dichloroethane	0.789	0.440	ND	0.220	~	~
Chloroform	ND	0.320	ND	0.160	~	~
1,1,1-Trichloroethane	ND	0.520	ND	0.260	~	~
Carbon tetrachloride	ND	0.780	ND	0.390	~	~
1,2-Dichloroethane (EDC)	ND	0.880	ND	0.440	~	~
Benzene	44.0	0.520	ND	0.260	~	~
Trichloroethene	ND	0.720	ND	0.360	~	~
1,2-Dichloropropane	ND	0.440	ND	0.220	~	~
Bromodichloromethane	ND	0.340	ND	0.170	~	~
2-Chloroethyl vinyl ether	ND	0.520	ND	0.260	~	~
cis-1,3-Dichloropropene	ND	0.560	ND	0.280	~	~
Toluene	13.6	0.520	ND	0.260	~	~
trans-1,3-Dichloropropene	ND	0.480	ND	0.240	~	~
1,1,2-Trichloroethane	ND	0.320	ND	0.160	~	~
Tetrachloroethene	ND	0.760	ND	0.380	~	~
Dibromochloromethane	ND	0.880	ND	0.440	~	~
Chlorobenzene	ND	0.440	ND	0.220	~	~
Ethylbenzene	59.4	0.800	ND	0.400	~	~
Total Xylenes	115	2.42	ND	1.21	~	~
Bromoform	ND	0.400	ND	0.200	~	~
1,1,2,2-Tetrachloroethane	ND	0.240	ND	0.120	~	~
1,3-Dichlorobenzene	ND	0.460	ND	0.230	~	~
1,4-Dichlorobenzene	ND	0.560	ND	0.280	~	~
1,2-Dichlorobenzene	ND	0.420	ND	0.210	~	~
TOTAL VO's:	245.59	1.54			1.49	
Semivolatiles - BNA (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
N-Nitrosodimethylamine	ND	0.460	ND	0.460	~	~
Phenol	ND	0.230	ND	0.230	~	~
Aniline	ND	0.540	ND	0.540	~	~
Bis(2-chloroethyl) ether	ND	0.220	ND	0.220	~	~
2-Chlorophenol	ND	0.300	ND	0.300	~	~
Benzyl alcohol	ND	0.410	ND	0.410	~	~
2-Methylphenol	ND	0.260	ND	0.260	~	~
Bis(2-chloroisopropyl) ether	ND	0.180	ND	0.180	~	~
4-Methylphenol	ND	0.280	ND	0.280	~	~

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Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY 41554977.029
Lab Case No.: E08-06213

PARAMETER(Units)	Lab ID:	06213-001	06213-002	06213-003	06213-004			
	Client ID:	29-PS1-85	29-PS6-85	29-PS3-85	29-DUP060208-85			
	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous			
	Sampled Date	6/2/08	6/2/08	6/2/08	6/2/08			
Conc	Q	MDL	Conc	Q	MDL			
Semivolatiles - BNA (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)			
N-Nitrosodi-n-propylamine	ND	0.210	ND	0.210	~	~	ND	0.210
Hexachloroethane	ND	0.290	ND	0.290	~	~	ND	0.290
Nitrobenzene	ND	0.230	ND	0.230	~	~	ND	0.230
Isophorone	ND	0.230	ND	0.230	~	~	ND	0.230
2-Nitrophenol	ND	0.570	ND	0.570	~	~	ND	0.570
2,4+2,5-Dimethylphenol	ND	0.500	ND	0.500	~	~	ND	0.500
Bis(2-chloroethoxy) methane	ND	0.210	ND	0.210	~	~	ND	0.210
Benzoic acid	ND	0.360	ND	0.360	~	~	ND	0.360
2,4-Dichlorophenol	ND	0.300	ND	0.300	~	~	ND	0.300
1,2,4-Trichlorobenzene	ND	0.220	ND	0.220	~	~	ND	0.220
Naphthalene	17.0	0.134	ND	0.134	~	~	ND	0.134
4-Chloroaniline	ND	0.680	ND	0.680	~	~	ND	0.680
Hexachlorobutadiene	ND	0.460	ND	0.460	~	~	ND	0.460
4-Chloro-3-methylphenol	ND	0.530	ND	0.530	~	~	ND	0.530
2-Methylnaphthalene	8.96	0.188	ND	0.188	~	~	ND	0.188
Hexachlorocyclopentadiene	ND	0.150	ND	0.150	~	~	ND	0.150
2,4,6-Trichlorophenol	ND	0.250	ND	0.250	~	~	ND	0.250
2,4,5-Trichlorophenol	ND	0.320	ND	0.320	~	~	ND	0.320
2-Chloronaphthalene	ND	0.140	ND	0.140	~	~	ND	0.140
2-Nitroaniline	ND	0.280	ND	0.280	~	~	ND	0.280
Dimethyl phthalate	ND	0.230	ND	0.230	~	~	ND	0.230
2,6-Dinitrotoluene	ND	0.340	ND	0.340	~	~	ND	0.340
Acenaphthylene	ND	0.146	ND	0.146	~	~	ND	0.146
3-Nitroaniline	ND	0.210	ND	0.210	~	~	ND	0.210
Acenaphthene	ND	0.206	ND	0.206	~	~	ND	0.206
2,4-Dinitrophenol	ND	0.330	ND	0.330	~	~	ND	0.330
4-Nitrophenol	ND	0.400	ND	0.400	~	~	ND	0.400
2,4-Dinitrotoluene	ND	0.340	ND	0.340	~	~	ND	0.340
Dibenzofuran	ND	0.170	ND	0.170	~	~	ND	0.170
Diethyl phthalate	ND	0.190	ND	0.190	~	~	ND	0.190
Fluorene	0.286	0.188	ND	0.188	~	~	ND	0.188
4-Chlorophenyl phenyl ether	ND	0.260	ND	0.260	~	~	ND	0.260
4-Nitroaniline	ND	0.530	ND	0.530	~	~	ND	0.530
4,6-Dinitro-2-methylphenol	ND	0.150	ND	0.150	~	~	ND	0.150
N-Nitrosodiphenylamine	ND	0.250	ND	0.250	~	~	ND	0.250
1,2-Diphenylhydrazine	ND	0.130	ND	0.130	~	~	ND	0.130
4-Bromophenyl phenyl ether	ND	0.290	ND	0.290	~	~	ND	0.290
Hexachlorobenzene	ND	0.210	ND	0.210	~	~	ND	0.210
Pentachlorophenol	ND	0.240	ND	0.240	~	~	ND	0.240
Phenanthrene	ND	0.200	ND	0.200	~	~	ND	0.200
Anthracene	ND	0.091	ND	0.091	~	~	ND	0.091
Carbazole	ND	0.110	ND	0.110	~	~	ND	0.110
Di-n-butyl phthalate	ND	0.100	ND	0.100	~	~	ND	0.100
Fluoranthene	ND	0.222	ND	0.222	~	~	ND	0.222
Benzidine	ND	0.320	ND	0.320	~	~	ND	0.320

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Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY 41554977.029
Lab Case No.: E08-06213

PARAMETER(Units)	Lab ID:	06213-001	06213-002	06213-003	06213-004				
	Client ID:	29-PS1-85	29-PS6-85	29-PS3-85	29-DUP060208-85				
Sampled Date	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous				
		6/2/08	6/2/08	6/2/08	6/2/08				
	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Semivolatiles - BNA (Units)		(ug/L-ppb)	(ug/L-ppb)				(ug/L-ppb)		
Pyrene	ND	0.176	ND	0.176	~	~	ND	0.176	
3,3'-Dimethylbenzidine	ND	0.210	ND	0.210	~	~	ND	0.210	
Butyl benzyl phthalate	ND	0.280	ND	0.280	~	~	ND	0.280	
3,3'-Dichlorobenzidine	ND	0.200	ND	0.200	~	~	ND	0.200	
Benzo[a]anthracene	ND	0.300	ND	0.300	~	~	ND	0.300	
Chrysene	ND	0.117	ND	0.117	~	~	ND	0.117	
Bis(2-ethylhexyl) phthalate	ND	0.220	ND	0.220	~	~	ND	0.220	
Di-n-octyl phthalate	ND	0.340	ND	0.340	~	~	ND	0.340	
Benzo[b]fluoranthene	ND	0.250	ND	0.250	~	~	ND	0.250	
Benzo[k]fluoranthene	ND	0.380	ND	0.380	~	~	ND	0.380	
Benzo[a]pyrene	ND	0.250	ND	0.250	~	~	ND	0.250	
Indeno[1,2,3-cd]pyrene	ND	0.190	ND	0.190	~	~	ND	0.190	
Dibenz[a,h]anthracene	ND	0.290	ND	0.290	~	~	ND	0.290	
Benzo[g,h,i]perylene	ND	0.215	ND	0.215	~	~	ND	0.215	
TOTAL BNA'S:	26.2	ND			ND				
PCB's (Units)		(ug/L-ppb)	(ug/L-ppb)				(ug/L-ppb)		
Aroclor-1016	ND	0.020	ND	0.020	~	~	ND	0.020	
Aroclor-1221	ND	0.020	ND	0.020	~	~	ND	0.020	
Aroclor-1232	ND	0.020	ND	0.020	~	~	ND	0.020	
Aroclor-1242	ND	0.020	ND	0.020	~	~	ND	0.020	
Aroclor-1248	ND	0.020	ND	0.020	~	~	ND	0.020	
Aroclor-1254	ND	0.020	ND	0.020	~	~	ND	0.020	
Aroclor-1260	ND	0.020	ND	0.020	~	~	ND	0.020	
Metals (Units)		(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)				
Aluminum	ND	40.0	ND	40.0	ND	40.0	ND	40.0	
Antimony	ND	4.00	ND	4.00	ND	4.00	ND	4.00	
Arsenic	2.89	2.00	ND	2.00	ND	2.00	ND	2.00	
Barium	47.1	40.0	ND	40.0	ND	40.0	ND	40.0	
Beryllium	ND	1.00	ND	1.00	ND	1.00	ND	1.00	
Cadmium	ND	1.00	ND	1.00	ND	1.00	ND	1.00	
Calcium	12700	200	2810	200	5950	200	3090	200	
Chromium	ND	8.00	ND	8.00	ND	8.00	ND	8.00	
Cobalt	ND	8.00	ND	8.00	ND	8.00	ND	8.00	
Copper	ND	8.00	ND	8.00	ND	8.00	ND	8.00	
Iron	25800	100	ND	100	1700	100	101	100	
Lead	ND	2.00	ND	2.00	ND	2.00	ND	2.00	
Magnesium	2360	200	1050	200	2320	200	1140	200	
Manganese	433	4.00	9.03	4.00	32.3	4.00	11.8	4.00	
Mercury	ND	0.500	ND	0.500	ND	0.500	ND	0.500	
Nickel	ND	4.00	ND	4.00	ND	4.00	ND	4.00	
Potassium	3870	200	1860	200	3910	200	1970	200	
Selenium	ND	8.00	ND	8.00	ND	8.00	ND	8.00	
Silver	ND	2.00	ND	2.00	ND	2.00	ND	2.00	
Sodium	28700	400	55500	400	120000	400	60500	400	
Thallium	ND	0.400	ND	0.400	ND	0.400	ND	0.400	
Vanadium	ND	8.00	ND	8.00	ND	8.00	ND	8.00	
Zinc	22.3	8.00	8.44	8.00	9.28	8.00	31.9	8.00	

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INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY 41554977.029
Lab Case No.: E08-06213

PARAMETER(Units)	Lab ID:	06213-001	06213-002	06213-003	06213-004
	Client ID:	29-PS1-85	29-PS6-85	29-PS3-85	29-DUP060208-85
Sampled Date	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous
	6/2/08	6/2/08	6/2/08	6/2/08	6/2/08
Conc	Q	MDL	Conc	Q	MDL
General Analytical (Units)					
Field Conductivity (ms/cm)	0.338	NA	0.605	NA	~
Field DO (mg/L)	5.88	NA	3.46	NA	~
Field Temperature(°C)	14.56	NA	18.99	NA	~
Field pH(S.U.)	6.21	NA	7.47	NA	~
Flow(gpm)	3.5	NA	0.0	NA	~
Field ORP(mV)	-65	NA	238	NA	~
Field Turbidity(NTU)	2.3	NA	0.0	NA	~
PARAMETER(Units)	Lab ID:	06213-005	06213-006	06213-007	06213-008
	Client ID:	29-MW16S-85	29-MW17S-85	29-MW18S-85	29-MW19S-85
Sampled Date	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous
	6/2/08	6/2/08	6/2/08	6/2/08	6/2/08
Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)
Chloromethane	ND	0.360	ND	0.360	ND
Vinyl chloride	ND	0.420	ND	0.420	ND
Bromomethane	ND	0.280	ND	0.280	ND
Chloroethane	ND	0.320	ND	0.320	ND
Trichlorofluoromethane	ND	0.550	ND	0.550	ND
Acrolein	ND	2.32	ND	2.32	ND
1,1-Dichloroethene	ND	0.460	ND	0.460	ND
Methylene chloride	ND	1.99	ND	1.99	ND
Acrylonitrile	ND	0.710	ND	0.710	ND
trans-1,2-Dichloroethene	ND	0.330	ND	0.330	ND
1,1-Dichloroethane	ND	0.220	ND	0.220	ND
Chloroform	0.290	0.160	ND	0.160	ND
1,1,1-Trichloroethane	ND	0.260	ND	0.260	ND
Carbon tetrachloride	ND	0.390	ND	0.390	ND
1,2-Dichloroethane (EDC)	ND	0.440	ND	0.440	ND
Benzene	ND	0.260	ND	0.260	ND
Trichloroethene	ND	0.360	ND	0.360	ND
1,2-Dichloropropane	ND	0.220	ND	0.220	ND
Bromodichloromethane	ND	0.170	ND	0.170	ND
2-Chloroethyl vinyl ether	ND	0.260	ND	0.260	ND
cis-1,3-Dichloropropene	ND	0.280	ND	0.280	ND
Toluene	ND	0.260	ND	0.260	ND
trans-1,3-Dichloropropene	ND	0.240	ND	0.240	ND
1,1,2-Trichloroethane	ND	0.160	ND	0.160	ND
Tetrachloroethene	ND	0.380	ND	0.380	ND
Dibromochloromethane	ND	0.440	ND	0.440	ND
Chlorobenzene	ND	0.220	ND	0.220	ND
Ethylbenzene	ND	0.400	ND	0.400	ND
Total Xylenes	ND	1.21	ND	1.21	ND
Bromoform	ND	0.200	ND	0.200	ND
1,1,2,2-Tetrachloroethane	ND	0.120	ND	0.120	ND
1,3-Dichlorobenzene	ND	0.230	ND	0.230	ND
1,4-Dichlorobenzene	ND	0.280	ND	0.280	ND
1,2-Dichlorobenzene	ND	0.210	ND	0.210	ND
TOTAL VO's:	0.29	ND	ND	0.210	ND

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ND = Analyzed for but Not Detected at the MDL

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY - 41554977.029
Lab Case No.: E08-07586

PARAMETER(Units)	Lab ID:	07586-001	07586-002	07586-003	07586-004							
	Client ID:	29-PS1-86	29-PS6-86	29-PS3-86	29-DUP70208-86							
Sampled Date	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous							
		7/2/08	7/2/08	7/2/08	7/2/08							
	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)		(ug/L-ppb)		(ug/L-ppb)						(ug/L-ppb)		
Chloromethane	ND	0.360	ND	0.360	~	~	ND	0.360				
Vinyl chloride	ND	0.420	ND	0.420	~	~	ND	0.420				
Bromomethane	ND	0.280	ND	0.280	~	~	ND	0.280				
Chloroethane	17.7	0.320	ND	0.320	~	~	ND	0.320				
Trichlorofluoromethane	ND	0.550	ND	0.550	~	~	ND	0.550				
Acrolein	ND	2.32	ND	2.32	~	~	ND	2.32				
1,1-Dichloroethene	ND	0.460	ND	0.460	~	~	ND	0.460				
Methylene chloride	ND	1.99	ND	1.99	~	~	ND	1.99				
Acrylonitrile	ND	0.710	ND	0.710	~	~	ND	0.710				
trans-1,2-Dichloroethene	ND	0.330	ND	0.330	~	~	ND	0.330				
1,1-Dichloroethane	0.946	0.220	ND	0.220	~	~	ND	0.220				
Chloroform	ND	0.160	ND	0.160	~	~	ND	0.160				
1,1,1-Trichloroethane	ND	0.260	ND	0.260	~	~	ND	0.260				
Carbon tetrachloride	ND	0.390	ND	0.390	~	~	ND	0.390				
1,2-Dichloroethane (EDC)	ND	0.440	ND	0.440	~	~	ND	0.440				
Benzene	46.6	0.260	ND	0.260	~	~	ND	0.260				
Trichloroethene	ND	0.360	ND	0.360	~	~	ND	0.360				
1,2-Dichloropropane	ND	0.220	ND	0.220	~	~	ND	0.220				
Bromodichloromethane	ND	0.170	ND	0.170	~	~	ND	0.170				
2-Chloroethyl vinyl ether	ND	0.260	ND	0.260	~	~	ND	0.260				
cis-1,3-Dichloropropene	ND	0.280	ND	0.280	~	~	ND	0.280				
Toluene	14.5	0.260	ND	0.260	~	~	ND	0.260				
trans-1,3-Dichloropropene	ND	0.240	ND	0.240	~	~	ND	0.240				
1,1,2-Trichloroethane	ND	0.160	ND	0.160	~	~	ND	0.160				
Tetrachloroethene	ND	0.380	ND	0.380	~	~	ND	0.380				
Dibromochloromethane	ND	0.440	ND	0.440	~	~	ND	0.440				
Chlorobenzene	ND	0.220	ND	0.220	~	~	ND	0.220				
Ethylbenzene	61.6	0.400	ND	0.400	~	~	ND	0.400				
Total Xylenes	116	1.21	ND	1.21	~	~	ND	1.21				
Bromoform	ND	0.200	ND	0.200	~	~	ND	0.200				
1,1,2,2-Tetrachloroethane	ND	0.120	ND	0.120	~	~	ND	0.120				
1,3-Dichlorobenzene	ND	0.230	ND	0.230	~	~	ND	0.230				
1,4-Dichlorobenzene	ND	0.280	ND	0.280	~	~	ND	0.280				
1,2-Dichlorobenzene	ND	0.210	ND	0.210	~	~	ND	0.210				
TOTAL VO's:		257.35	ND				ND					
Semivolatiles - BNA (Units)		(ug/L-ppb)		(ug/L-ppb)				(ug/L-ppb)				
N-Nitrosodimethylamine	ND	0.460	ND	0.460	~	~	ND	0.460				
Phenol	ND	0.230	ND	0.230	~	~	ND	0.230				
Aniline	ND	0.540	ND	0.540	~	~	ND	0.540				
Bis(2-chloroethyl) ether	ND	0.220	ND	0.220	~	~	ND	0.220				
1,4-Dichlorobenzene	ND	0.140	ND	0.140	~	~	ND	0.140				
Benzyl alcohol	ND	0.410	ND	0.410	~	~	ND	0.410				
2-Methylphenol	ND	0.260	ND	0.260	~	~	ND	0.260				
Bis(2-chloroisopropyl) ether	ND	0.180	ND	0.180	~	~	ND	0.180				
4-Methylphenol	ND	0.280	ND	0.280	~	~	ND	0.280				

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MQNTHLY - 41554977.029
Lab Case No.: E08-07586

PARAMETER(Units)	Lab ID:	07586-001	07586-002	07586-003	07586-004				
	Client ID:	29-PS1-86	29-PS6-86	29-PS3-86	29-DUP70208-86				
	Matrix:	Aqueous 7/2/08	Aqueous 7/2/08	Aqueous 7/2/08	Aqueous 7/2/08				
Sampled Date	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Semivolatiles - BNA (Units)	(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)		
N-Nitrosodi-n-propylamine	ND	0.210	ND	0.210	~	~	ND	0.210	
Hexachloroethane	ND	0.290	ND	0.290	~	~	ND	0.290	
Nitrobenzene	ND	0.230	ND	0.230	~	~	ND	0.230	
Isophorone	ND	0.230	ND	0.230	~	~	ND	0.230	
2-Nitrophenol	ND	0.570	ND	0.570	~	~	ND	0.570	
2,4+2,5-Dimethylphenol	ND	0.500	ND	0.500	~	~	ND	0.500	
Bis(2-chloroethoxy) methane	ND	0.210	ND	0.210	~	~	ND	0.210	
Benzoic acid	ND	0.360	ND	0.360	~	~	ND	0.360	
2,4-Dichlorophenol	ND	0.300	ND	0.300	~	~	ND	0.300	
1,2,4-Trichlorobenzene	ND	0.220	ND	0.220	~	~	ND	0.220	
Naphthalene	17.1	0.134	ND	0.134	~	~	ND	0.134	
4-Chloroaniline	ND	0.680	ND	0.680	~	~	ND	0.680	
Hexachlorobutadiene	ND	0.460	ND	0.460	~	~	ND	0.460	
4-Chloro-3-methylphenol	ND	0.530	ND	0.530	~	~	ND	0.530	
2-Methylnaphthalene	9.48	0.188	ND	0.188	~	~	ND	0.188	
Hexachlorocyclopentadiene	ND	0.150	ND	0.150	~	~	ND	0.150	
2,4,6-Trichlorophenol	ND	0.250	ND	0.250	~	~	ND	0.250	
2,4,5-Trichlorophenol	ND	0.320	ND	0.320	~	~	ND	0.320	
2-Chloronaphthalene	ND	0.140	ND	0.140	~	~	ND	0.140	
2-Nitroaniline	ND	0.280	ND	0.280	~	~	ND	0.280	
Dimethyl phthalate	ND	0.230	ND	0.230	~	~	ND	0.230	
2,6-Dinitrotoluene	ND	0.340	ND	0.340	~	~	ND	0.340	
Acenaphthylene	ND	0.146	ND	0.146	~	~	ND	0.146	
3-Nitroaniline	ND	0.210	ND	0.210	~	~	ND	0.210	
Acenaphthene	ND	0.206	ND	0.206	~	~	ND	0.206	
2,4-Dinitrophenol	ND	0.330	ND	0.330	~	~	ND	0.330	
4-Nitrophenol	ND	0.400	ND	0.400	~	~	ND	0.400	
2,4-Dinitrotoluene	ND	0.340	ND	0.340	~	~	ND	0.340	
Dibenzofuran	ND	0.170	ND	0.170	~	~	ND	0.170	
Diethyl phthalate	ND	0.190	ND	0.190	~	~	ND	0.190	
Fluorene	ND	0.188	ND	0.188	~	~	ND	0.188	
4-Chlorophenyl phenyl ether	ND	0.260	ND	0.260	~	~	ND	0.260	
4-Nitroaniline	ND	0.530	ND	0.530	~	~	ND	0.530	
4,6-Dinitro-2-methylphenol	ND	0.150	ND	0.150	~	~	ND	0.150	
N-Nitrosodiphenylamine	ND	0.250	ND	0.250	~	~	ND	0.250	
1,2-Diphenylhydrazine	ND	0.130	ND	0.130	~	~	ND	0.130	
4-Bromophenyl phenyl ether	ND	0.290	ND	0.290	~	~	ND	0.290	
Hexachlorobenzene	ND	0.210	ND	0.210	~	~	ND	0.210	
Pentachlorophenol	ND	0.240	ND	0.240	~	~	ND	0.240	
Phenanthrene	ND	0.200	ND	0.200	~	~	ND	0.200	
Anthracene	ND	0.091	ND	0.091	~	~	ND	0.091	
Carbazole	ND	0.110	ND	0.110	~	~	ND	0.110	
Di-n-butyl phthalate	ND	0.100	ND	0.100	~	~	ND	0.100	
Fluoranthene	ND	0.222	ND	0.222	~	~	ND	0.222	
Benzidine	ND	0.320	ND	0.320	~	~	ND	0.320	

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY - 41554977.029
Lab Case No.: E08-07586

PARAMETER(Units)	Lab ID:	07586-001	07586-002	07586-003	07586-004	
	Client ID:	29-PS1-86	29-PS6-86	29-PS3-86	29-DUP70208-86	
	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous	
	Sampled Date	7/2/08	7/2/08	7/2/08	7/2/08	
Conc	Q	MDL	Conc	Q	MDL	
Semivolatiles - BNA (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
Pyrene	ND	0.176	ND	0.176	~	~
3,3'-Dimethylbenzidine	ND	0.210	ND	0.210	~	~
Butyl benzyl phthalate	ND	0.280	ND	0.280	~	~
3,3'-Dichlorobenzidine	ND	0.200	ND	0.200	~	~
Benzo[a]anthracene	ND	0.300	ND	0.300	~	~
Chrysene	ND	0.117	ND	0.117	~	~
Bis(2-ethylhexyl) phthalate	ND	0.220	ND	0.220	~	~
Di-n-octyl phthalate	ND	0.340	ND	0.340	~	~
Benzo[b]fluoranthene	ND	0.250	ND	0.250	~	~
Benzo[k]fluoranthene	ND	0.380	ND	0.380	~	~
Benzo[a]pyrene	ND	0.250	ND	0.250	~	~
Indeno[1,2,3-cd]pyrene	ND	0.190	ND	0.190	~	~
Dibenz[a,h]anthracene	ND	0.290	ND	0.290	~	~
Benzo[g,h,i]perylene	ND	0.215	ND	0.215	~	~
TOTAL BNA'S:	26.6	ND			ND	
PCB's (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
Aroclor-1016	ND	0.020	ND	0.020	~	~
Aroclor-1221	ND	0.020	ND	0.020	~	~
Aroclor-1232	ND	0.020	ND	0.020	~	~
Aroclor-1242	ND	0.020	ND	0.020	~	~
Aroclor-1248	ND	0.020	ND	0.020	~	~
Aroclor-1254	ND	0.020	ND	0.020	~	~
Aroclor-1260	ND	0.020	ND	0.020	~	~
Metals (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)	
Aluminum	ND	40.0	ND	40.0	ND	40.0
Antimony	ND	4.00	ND	4.00	ND	4.00
Arsenic	3.12	2.00	ND	2.00	ND	2.00
Barium	45.9	40.0	ND	40.0	ND	40.0
Beryllium	ND	1.00	ND	1.00	ND	1.00
Cadmium	ND	1.00	ND	1.00	ND	1.00
Calcium	12500	200	2480	200	4640	200
Chromium	ND	8.00	ND	8.00	ND	8.00
Cobalt	ND	8.00	ND	8.00	ND	8.00
Copper	ND	8.00	ND	8.00	ND	8.00
Iron	24700	100	241	100	1440	100
Lead	ND	2.00	ND	2.00	ND	2.00
Magnesium	2460	200	2450	200	2320	200
Manganese	380	4.00	ND	4.00	21.2	4.00
Mercury	ND	0.500	ND	0.500	ND	0.500
Nickel	ND	4.00	ND	4.00	ND	4.00
Potassium	4090	200	23100	200	4830	200
Selenium	ND	8.00	ND	8.00	ND	8.00
Silver	ND	2.00	ND	2.00	ND	2.00
Sodium	31000	400	135000	400	135000	400
Thallium	ND	0.400	ND	0.400	ND	0.400
Vanadium	ND	8.00	ND	8.00	ND	8.00
Zinc	21.0	8.00	11.8	8.00	9.55	8.00

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT

Client: URS Construction Services

Project: AREA 29 MONTHLY - 41554977.029

Lab Case No.: E08-07586

	Lab ID: Client ID: Matrix: Sampled Date	07586-001 29-PS1-86 Aqueous 7/2/08	07586-002 29-PS6-86 Aqueous 7/2/08	07586-003 29-PS3-86 Aqueous 7/2/08	07586-004 29-DUP70208-86 Aqueous 7/2/08
PARAMETER(Units)		Conc Q MDL	Conc Q MDL	Conc Q MDL	Conc Q MDL
General Analytical (Units)					
Field Conductivity (ms/cm)		0.340	NA	0.661	NA
Field DO (mg/L)		9.34	NA	2.87	NA
Field Temperature(°C)		17.57	NA	21.63	NA
Field pH(S.U.)		6.09	NA	8.99	NA
Flow(gpm)		3.4	NA	17.1	NA
Turbidity(N.T.U.)		3.1	NA	0.0	NA
ORP(mV)		-76	NA	226	NA
	Lab ID: Client ID: Matrix: Sampled Date	07586-005 29-MW16S-86 Aqueous 7/1/08	07586-006 29-MW17S-86 Aqueous 7/1/08	07586-007 29-MW18S-86 Aqueous 7/1/08	07586-008 29-MW19S-86 Aqueous 7/1/08
PARAMETER(Units)		Conc Q MDL	Conc Q MDL	Conc Q MDL	Conc Q MDL
Volatiles (Units)					
		(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)
Chloromethane		ND	0.360	ND	0.360
Vinyl chloride		ND	0.420	ND	0.420
Bromomethane		ND	0.280	ND	0.280
Chloroethane		ND	0.320	ND	0.320
Trichlorofluoromethane		ND	0.550	ND	0.550
Acrolein		ND	2.32	ND	2.32
1,1-Dichloroethene		ND	0.460	ND	0.460
Methylene chloride		ND	1.99	ND	1.99
Acrylonitrile		ND	0.710	ND	0.710
trans-1,2-Dichloroethene		ND	0.330	ND	0.330
1,1-Dichloroethane		ND	0.220	ND	0.220
Chloroform		0.206	0.160	ND	0.160
1,1,1-Trichloroethane		ND	0.260	ND	0.260
Carbon tetrachloride		ND	0.390	ND	0.390
1,2-Dichloroethane (EDC)		ND	0.440	ND	0.440
Benzene		ND	0.260	ND	0.260
Trichloroethene		ND	0.360	ND	0.360
1,2-Dichloropropane		ND	0.220	ND	0.220
Bromodichloromethane		ND	0.170	ND	0.170
2-Chloroethyl vinyl ether		ND	0.260	ND	0.260
cis-1,3-Dichloropropene		ND	0.280	ND	0.280
Toluene		ND	0.260	ND	0.260
trans-1,3-Dichloropropene		ND	0.240	ND	0.240
1,1,2-Trichloroethane		ND	0.160	ND	0.160
Tetrachloroethene		ND	0.380	ND	0.380
Dibromochloromethane		ND	0.440	ND	0.440
Chlorobenzene		ND	0.220	ND	0.220
Ethylbenzene		ND	0.400	ND	0.400
Total Xylenes		ND	1.21	ND	1.21
Bromoform		ND	0.200	ND	0.200
1,1,2,2-Tetrachloroethane		ND	0.120	ND	0.120
1,3-Dichlorobenzene		ND	0.230	ND	0.230
1,4-Dichlorobenzene		ND	0.280	ND	0.280
1,2-Dichlorobenzene		ND	0.210	ND	0.210
TOTAL VO's:		0.206	ND	0.168	ND

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY 41554977.029

Lab Case No.: E08-08950

PARAMETER(Units)	Lab ID:	08950-001	08950-002	08950-003	08950-004
	Client ID:	29-PS1-88	29-PS6-88	29-PS3-88	29-DUP080408-88
Matrix:	Aqueous	Aqueous	Aqueous	Aqueous	
Sampled Date	8/4/08	8/4/08	8/4/08	8/4/08	8/4/08
Conc	Q	MDL	Conc	Q	MDL
Semivolatiles - BNA (Units)	(ug/L-ppb)	(ug/L-ppb)			(ug/L-ppb)
Pyrene	ND	0.176	ND	0.176	~
3,3'-Dimethylbenzidine	ND	0.210	ND	0.210	~
Butyl benzyl phthalate	ND	0.280	ND	0.280	~
3,3'-Dichlorobenzidine	ND	0.200	ND	0.200	~
Benzo[a]anthracene	ND	0.300	ND	0.300	~
Chrysene	ND	0.117	ND	0.117	~
Bis(2-ethylhexyl) phthalate	ND	0.220	ND	0.220	~
Di-n-octyl phthalate	ND	0.340	ND	0.340	~
Benzo[b]fluoranthene	ND	0.250	ND	0.250	~
Benzo[k]fluoranthene	ND	0.380	ND	0.380	~
Benzo[a]pyrene	ND	0.250	ND	0.250	~
Indeno[1,2,3-cd]pyrene	ND	0.190	ND	0.190	~
Dibenz[a,h]anthracene	ND	0.290	ND	0.290	~
Benzo[g,h,i]perylene	ND	0.215	ND	0.215	~
TOTAL BNA'S:	24.4	1.80			ND
PCB's (Units)	(ug/L-ppb)	(ug/L-ppb)			(ug/L-ppb)
Aroclor-1016	ND	0.020	ND	0.020	~
Aroclor-1221	ND	0.020	ND	0.020	~
Aroclor-1232	ND	0.020	ND	0.020	~
Aroclor-1242	ND	0.020	ND	0.020	~
Aroclor-1248	ND	0.020	ND	0.020	~
Aroclor-1254	ND	0.020	ND	0.020	~
Aroclor-1260	ND	0.020	ND	0.020	~
Metals (Units)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	
Aluminum	ND	40.0	ND	40.0	ND
Antimony	ND	4.00	ND	4.00	ND
Arsenic	3.46	2.00	ND	2.00	ND
Barium	50.2	40.0	ND	40.0	ND
Beryllium	ND	1.00	ND	1.00	ND
Cadmium	ND	1.00	ND	1.00	ND
Calcium	14400	200	9420	200	14200
Chromium	ND	8.00	ND	8.00	ND
Cobalt	ND	8.00	ND	8.00	ND
Copper	ND	8.00	ND	8.00	ND
Iron	25000	100	ND	100	2810
Lead	ND	2.00	ND	2.00	ND
Magnesium	2630	200	2020	200	2770
Manganese	407	4.00	21.1	4.00	123
Mercury	ND	0.500	ND	0.500	ND
Nickel	ND	4.00	ND	4.00	ND
Potassium	5060	200	3340	200	5100
Selenium	ND	8.00	ND	8.00	ND
Silver	ND	2.00	ND	2.00	ND
Sodium	38500	400	72700	400	108000
					400
					76900

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 FAA - 41554979.1023
Lab Case No.: E08-11732

Lab ID:	11732-001	11732-002 29-PS6-90 NEW	11732-003	11732-004
Client ID:	29-PS1-90	CARBON	29-PS3-90	29-DUP100808-90
Matrix:	Aqueous	Aqueous	Aqueous	Aqueous
Sampled Date	10/8/08	10/8/08	10/8/08	10/8/08
PARAMETER(Units)	Conc	Q	MDL	Conc
Volatiles (Units)	(ug/L-ppb)		(ug/L-ppb)	
Chloromethane	ND	0.340	ND	0.340
Vinyl chloride	ND	0.270	ND	0.270
Bromomethane	ND	0.580	ND	0.580
Chloroethane	23.9	0.540	ND	0.540
Trichlorofluoromethane	ND	0.360	ND	0.360
Acrolein	ND	3.10	ND	3.10
1,1-Dichloroethene	1.21	0.410	ND	0.410
Methylene chloride	ND	1.98	ND	1.98
Acrylonitrile	ND	5.00	ND	5.00
trans-1,2-Dichloroethene	ND	0.420	ND	0.420
1,1-Dichloroethane	2.32	0.230	ND	0.230
Chloroform	ND	0.250	ND	0.250
1,1,1-Trichloroethane	ND	0.420	ND	0.420
Carbon tetrachloride	ND	0.420	ND	0.420
1,2-Dichloroethane (EDC)	ND	0.110	ND	0.110
Benzene	48.8	0.250	ND	0.250
Trichloroethene	ND	0.390	ND	0.390
1,2-Dichloropropane	ND	0.230	ND	0.230
Bromodichloromethane	ND	0.200	ND	0.200
2-Chloroethyl vinyl ether	ND	0.200	ND	0.200
cis-1,3-Dichloropropene	ND	0.210	ND	0.210
Toluene	4.75	0.260	ND	0.260
trans-1,3-Dichloropropene	ND	0.210	ND	0.210
1,1,2-Trichloroethane	ND	0.160	ND	0.160
Tetrachloroethene	ND	0.400	ND	0.400
Dibromochloromethane	ND	0.140	ND	0.140
Chlorobenzene	ND	0.220	ND	0.220
Ethylbenzene	42.2	0.300	ND	0.300
Total Xylenes	62.4	0.970	ND	0.970
Bromoform	ND	0.220	ND	0.220
1,1,2,2-Tetrachloroethane	ND	0.110	ND	0.110
1,3-Dichlorobenzene	ND	0.290	ND	0.290
1,4-Dichlorobenzene	ND	0.240	ND	0.240
1,2-Dichlorobenzene	ND	0.280	ND	0.280
TOTAL VOC's:	185.58	ND		ND
Semivolatiles - BNA (Units)	(ug/L-ppb)		(ug/L-ppb)	
N-Nitrosodimethylamine	ND	0.180	ND	0.180
Phenol	ND	0.150	ND	0.150
Aniline	ND	0.230	ND	0.230
Bis(2-chloroethyl) ether	ND	0.130	ND	0.130
2-Chlorophenol	ND	0.090	ND	0.090
1,3-Dichlorobenzene	ND	0.200	ND	0.200
1,4-Dichlorobenzene	ND	0.130	ND	0.130
Benzyl alcohol	ND	0.180	ND	0.180
1,2-Dichlorobenzene	ND	0.080	ND	0.080
2-Methylphenol	ND	0.090	ND	0.090
Bis(2-chloroisopropyl) ether	ND	0.130	ND	0.130
4-Methylphenol	ND	0.160	ND	0.160

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

Project: AREA 29 FAA - 41554979.1023

Lab Case No.: E08-11732

Lab ID:	11732-001	11732-002 29-PS6-90 NEW	11732-003	11732-004
Client ID:	29-PS1-90	CARBON	29-PS3-90	29-DUP100808-90
Matrix:	Aqueous	Aqueous	Aqueous	Aqueous
Sampled Date	10/8/08	10/8/08	10/8/08	10/8/08
PARAMETER(Units)	Conc	Q	MDL	Conc
Semivolatiles - BNA (Units)	(ug/L-ppb)	(ug/L-ppb)		(ug/L-ppb)
N-Nitrosodi-n-propylamine	ND	0.150	ND	0.150
Hexachloroethane	ND	0.290	ND	0.290
Nitrobenzene	ND	0.130	ND	0.130
Isophorone	ND	0.120	ND	0.120
2-Nitrophenol	ND	0.180	ND	0.180
2,4-Dimethylphenol	ND	0.110	ND	0.110
Bis(2-chloroethoxy) methane	ND	0.100	ND	0.100
Benzoic acid	ND	0.240	ND	0.240
2,4-Dichlorophenol	ND	0.190	ND	0.190
1,2,4-Trichlorobenzene	ND	0.150	ND	0.150
Naphthalene	13.9	0.168	ND	0.168
4-Chloroaniline	ND	0.110	ND	0.110
Hexachlorobutadiene	ND	0.200	ND	0.200
4-Chloro-3-methylphenol	ND	0.160	ND	0.160
2-Methylnaphthalene	6.74	0.139	ND	0.139
Hexachlorocyclopentadiene	ND	0.090	ND	0.090
2,4,6-Trichlorophenol	ND	0.160	ND	0.160
2,4,5-Trichlorophenol	ND	0.330	ND	0.330
2-Chloronaphthalene	ND	0.210	ND	0.210
2-Nitroaniline	ND	0.310	ND	0.310
Dimethyl phthalate	ND	0.140	ND	0.140
2,6-Dinitrotoluene	ND	0.500	ND	0.500
Acenaphthylene	ND	0.715	ND	0.715
3-Nitroaniline	ND	0.170	ND	0.170
Acenaphthene	ND	0.131	ND	0.131
2,4-Dinitrophenol	ND	0.150	ND	0.150
4-Nitrophenol	ND	0.210	ND	0.210
2,4-Dinitrotoluene	ND	0.170	ND	0.170
Dibenzofuran	ND	0.200	ND	0.200
Diethyl phthalate	ND	0.170	ND	0.170
Fluorene	ND	0.126	ND	0.126
4-Chlorophenyl phenyl ether	ND	0.160	ND	0.160
4-Nitroaniline	ND	0.090	ND	0.090
4,6-Dinitro-2-methylphenol	ND	0.150	ND	0.150
N-Nitrosodiphenylamine	ND	0.360	ND	0.360
1,2-Diphenylhydrazine	ND	0.160	ND	0.160
4-Bromophenyl phenyl ether	ND	0.190	ND	0.190
Hexachlorobenzene	ND	0.170	ND	0.170
Pentachlorophenol	ND	0.130	ND	0.130
Phenanthrene	ND	0.644	ND	0.644
Anthracene	ND	0.113	ND	0.113
Carbazole	ND	0.350	ND	0.350
Di-n-butyl phthalate	ND	0.070	ND	0.070
Fluoranthene	ND	0.153	ND	0.153
Benzidine	ND	0.130	ND	0.130
Pyrene	ND	0.240	ND	0.240
3,3'-Dimethylbenzidine	ND	0.140	ND	0.140
Butyl benzyl phthalate	ND	0.200	ND	0.200
3,3'-Dichlorobenzidine	ND	0.290	ND	0.290

~= Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

SUMMARY REPORT

Client: URS Construction Services

Project: AREA 29 FAA - 41554979.1023

Lab Case No.: E08-11732

Lab ID:	11732-001	11732-002	11732-003	11732-004
Client ID:	29-PS1-90	29-PS6-90 NEW CARBON	29-PS3-90	29-DUP100808-90
Matrix:	Aqueous	Aqueous	Aqueous	Aqueous
Sampled Date	10/8/08	10/8/08	10/8/08	10/8/08
PARAMETER(Units)	Conc	Q	MDL	Conc
Semivolatiles - BNA (Units)	<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>	
Benzo[a]anthracene	ND	0.120	ND	0.120
Chrysene	ND	0.146	ND	0.146
Bis(2-ethylhexyl) phthalate	ND	0.200	ND	0.200
Di-n-octyl phthalate	ND	0.390	ND	0.390
Benzo[b]fluoranthene	ND	0.940	ND	0.940
Benzo[k]fluoranthene	ND	0.180	ND	0.180
Benzo[a]pyrene	ND	0.110	ND	0.110
Indeno[1,2,3-cd]pyrene	ND	0.150	ND	0.150
Dibenz[a,h]anthracene	ND	0.100	ND	0.100
Benzo[g,h,i]perylene	ND	0.225	ND	0.225
TOTAL BNA'S:	20.6	ND		ND
PCB's (Units)	<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>	
Aroclor-1016	ND	0.020	ND	0.020
Aroclor-1221	ND	0.020	ND	0.020
Aroclor-1232	ND	0.020	ND	0.020
Aroclor-1242	ND	0.020	ND	0.020
Aroclor-1248	ND	0.020	ND	0.020
Aroclor-1254	ND	0.020	ND	0.020
Aroclor-1260	ND	0.020	ND	0.020
Metals (Units)	<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>	
Aluminum	ND	40.0	668	40.0
Antimony	ND	4.00	ND	4.00
Arsenic	4.70	2.00	10.9	2.00
Barium	48.5	40.0	ND	40.0
Beryllium	ND	1.00	ND	1.00
Cadmium	ND	1.00	ND	1.00
Calcium	14600	200	12400	200
Chromium	ND	8.00	ND	8.00
Cobalt	ND	8.00	ND	8.00
Copper	ND	8.00	ND	8.00
Iron	24400	100	ND	100
Lead	ND	2.00	ND	2.00
Magnesium	2440	200	5820	200
Manganese	431	4.00	11.6	4.00
Mercury	ND	0.500	ND	0.500
Nickel	ND	4.00	ND	4.00
Potassium	4820	200	4670	200
Selenium	ND	8.00	ND	8.00
Silver	ND	2.00	ND	2.00
Sodium	36000	400	123000	400
Thallium	ND	0.400	ND	0.400
Vanadium	ND	8.00	ND	8.00
Zinc	10.8	8.00	ND	8.00
General Analytical (Units)				
Field Conductivity(ms/cm)	0.396	NA	0.652	NA
Field DO(mg/L)	1.17	NA	2.84	NA
Field Temperature(°C)	18.23	NA	18.66	NA
Field pH(S.U.)	6.17	NA	8.58	NA
Flow(gpm)(S.U.)	3.3	NA	0.0	NA
Field Turbidity(N.T.U.)	0.0	NA	0.0	NA
Field ORP(mV)	-75	NA	432	NA

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

SUMMARY REPORT

Client: URS Construction Services

Project: AREA 29 FAA - 41554979.1023

Lab Case No.: E08-11732

Lab ID:	11732-005	11732-006	11732-007	11732-008
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INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY - 41554979.1023
Lab Case No.: E08-12817

PARAMETER(Units)	Lab ID:	12817-001	12817-002	12817-003	12817-004			
	Client ID:	29-PS1-92	29-PS6-92	29-PS3-92	29-DUP110508-92			
	Matrix:	Aqueous	Aqueous	Aqueous	Aqueous			
	Sampled Date	11/5/08	11/5/08	11/5/08	11/5/08			
Conc	Q	MDL	Conc	Q	MDL			
Volatiles (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)			
Chloromethane	ND	0.340	ND	0.340	~	~	ND	0.340
Vinyl chloride	ND	0.270	ND	0.270	~	~	ND	0.270
Bromomethane	ND	0.580	ND	0.580	~	~	ND	0.580
Chloroethane	36.5	0.540	ND	0.540	~	~	ND	0.540
Trichlorofluoromethane	ND	0.360	ND	0.360	~	~	ND	0.360
Acrolein	ND	3.10	ND	3.10	~	~	ND	3.10
1,1-Dichloroethene	1.64	0.410	ND	0.410	~	~	ND	0.410
Methylene chloride	ND	1.98	ND	1.98	~	~	ND	1.98
Acrylonitrile	ND	0.930	ND	0.930	~	~	ND	0.930
trans-1,2-Dichloroethene	ND	0.420	ND	0.420	~	~	ND	0.420
1,1-Dichloroethane	2.82	0.230	ND	0.230	~	~	ND	0.230
Chloroform	ND	0.250	ND	0.250	~	~	ND	0.250
1,1,1-Trichloroethane	ND	0.420	ND	0.420	~	~	ND	0.420
Carbon tetrachloride	ND	0.420	ND	0.420	~	~	ND	0.420
1,2-Dichloroethane (EDC)	ND	0.110	ND	0.110	~	~	ND	0.110
Benzene	58.7	0.250	ND	0.250	~	~	ND	0.250
Trichloroethene	ND	0.390	ND	0.390	~	~	ND	0.390
1,2-Dichloropropane	ND	0.230	ND	0.230	~	~	ND	0.230
Bromodichloromethane	ND	0.200	ND	0.200	~	~	ND	0.200
2-Chloroethyl vinyl ether	ND	0.200	ND	0.200	~	~	ND	0.200
cis-1,3-Dichloropropene	ND	0.210	ND	0.210	~	~	ND	0.210
Toluene	6.69	0.260	ND	0.260	~	~	ND	0.260
trans-1,3-Dichloropropene	ND	0.210	ND	0.210	~	~	ND	0.210
1,1,2-Trichloroethane	0.395	0.160	ND	0.160	~	~	ND	0.160
Tetrachloroethene	ND	0.400	ND	0.400	~	~	ND	0.400
Dibromochloromethane	ND	0.140	ND	0.140	~	~	ND	0.140
Chlorobenzene	ND	0.220	ND	0.220	~	~	ND	0.220
Ethylbenzene	45.9	0.300	ND	0.300	~	~	ND	0.300
Total Xylenes	73.1	0.970	ND	0.970	~	~	ND	0.970
Bromoform	ND	0.220	ND	0.220	~	~	ND	0.220
1,1,2,2-Tetrachloroethane	ND	0.110	ND	0.110	~	~	ND	0.110
1,3-Dichlorobenzene	ND	0.290	ND	0.290	~	~	ND	0.290
1,4-Dichlorobenzene	ND	0.240	ND	0.240	~	~	ND	0.240
1,2-Dichlorobenzene	ND	0.280	ND	0.280	~	~	ND	0.280
TOTAL VO's:	225.75	ND			ND			
Semivolatiles - BNA (Units)	(ug/L-ppb)		(ug/L-ppb)		(ug/L-ppb)			
N-Nitrosodimethylamine	ND	0.190	ND	0.190	~	~	ND	0.190
Phenol	ND	0.140	ND	0.140	~	~	ND	0.140
Aniline	ND	0.080	ND	0.080	~	~	ND	0.080
Bis(2-chloroethyl) ether	ND	0.160	ND	0.160	~	~	ND	0.160
2-Chlorophenol	ND	0.100	ND	0.100	~	~	ND	0.100
Benzyl alcohol	ND	0.220	ND	0.220	~	~	ND	0.220
2-Methylphenol	ND	0.090	ND	0.090	~	~	ND	0.090
Bis(2-chloroisopropyl) ether	ND	0.100	ND	0.100	~	~	ND	0.100
4-Methylphenol	ND	0.170	ND	0.170	~	~	ND	0.170
N-Nitrosodi-n-propylamine	ND	0.160	ND	0.160	~	~	ND	0.160
Hexachloroethane	ND	0.260	ND	0.260	~	~	ND	0.260
Nitrobenzene	ND	0.200	ND	0.200	~	~	ND	0.200

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MONTHLY - 41554979.1023
Lab Case No.: E08-12817

PARAMETER(Units)	Lab ID: Client ID: Matrix: Sampled Date	12817-001 29-PS1-92 Aqueous 11/5/08	12817-002 29-PS6-92 Aqueous 11/5/08	12817-003 29-PS3-92 Aqueous 11/5/08	12817-004 29-DUP110508-92 Aqueous 11/5/08
		Conc Q MDL	Conc Q MDL	Conc Q MDL	Conc Q MDL
Semivolatiles - BNA (Units)		(ug/L-ppb)	(ug/L-ppb)		(ug/L-ppb)
Isophorone	ND	0.120	ND	0.120	~
2-Nitrophenol	ND	0.300	ND	0.300	~
2,4-Dimethylphenol	ND	0.160	ND	0.160	~
Bis(2-chloroethoxy) methane	ND	0.170	ND	0.170	~
Benzoic acid	ND	0.160	ND	0.160	~
2,4-Dichlorophenol	ND	0.170	ND	0.170	~
1,2,4-Trichlorobenzene	ND	0.200	ND	0.200	~
Naphthalene	17.7	0.137	ND	0.137	~
4-Chloroaniline	ND	0.230	ND	0.230	~
Hexachlorobutadiene	ND	0.180	ND	0.180	~
4-Chloro-3-methylphenol	ND	0.200	ND	0.200	~
2-Methylnaphthalene	11.0	0.204	ND	0.204	~
Hexachlorocyclopentadiene	ND	0.090	ND	0.090	~
2,4,6-Trichlorophenol	ND	0.170	ND	0.170	~
2,4,5-Trichlorophenol	ND	0.160	ND	0.160	~
2-Chloronaphthalene	ND	0.160	ND	0.160	~
2-Nitroaniline	ND	0.340	ND	0.340	~
Dimethyl phthalate	ND	0.190	ND	0.190	~
2,6-Dinitrotoluene	ND	0.230	ND	0.230	~
Acenaphthylene	ND	0.105	ND	0.105	~
3-Nitroaniline	ND	0.250	ND	0.250	~
Acenaphthene	0.235	0.179	ND	0.179	~
2,4-Dinitrophenol	ND	0.370	ND	0.370	~
4-Nitrophenol	ND	0.190	ND	0.190	~
2,4-Dinitrotoluene	ND	0.310	ND	0.310	~
Dibenzofuran	0.365	0.070	ND	0.070	~
Diethyl phthalate	ND	0.120	ND	0.120	~
Fluorene	0.254	0.116	ND	0.116	~
4-Chlorophenyl phenyl ether	ND	0.150	ND	0.150	~
4-Nitroaniline	ND	0.340	ND	0.340	~
4,6-Dinitro-2-methylphenol	ND	0.320	ND	0.320	~
N-Nitrosodiphenylamine	ND	0.110	ND	0.110	~
1,2-Diphenylhydrazine	ND	0.120	ND	0.120	~
4-Bromophenyl phenyl ether	ND	0.210	ND	0.210	~
Hexachlorobenzene	ND	0.240	ND	0.240	~
Pentachlorophenol	ND	0.100	ND	0.100	~
Phenanthrene	ND	0.105	ND	0.105	~
Anthracene	ND	0.112	ND	0.112	~
Carbazole	ND	0.080	ND	0.080	~
Di-n-butyl phthalate	ND	0.110	ND	0.110	~
Fluoranthene	ND	0.150	ND	0.150	~
Benzidine	ND	0.130	ND	0.130	~
Pyrene	ND	0.155	ND	0.155	~
3,3'-Dimethylbenzidine	ND	0.330	ND	0.330	~
Butyl benzyl phthalate	ND	0.370	ND	0.370	~
3,3'-Dichlorobenzidine	ND	0.410	ND	0.410	~
Benzo[a]anthracene	ND	0.170	ND	0.170	~
Chrysene	ND	0.362	ND	0.362	~

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

Client: URS Construction Services
 Project: AREA 29 MONTHLY - 41554979.1023
 Lab Case No.: E08-12817

PARAMETER(Units)	Lab ID: Client ID: Matrix: Sampled Date	Conc Q MDL				
Semivolatiles - BNA (Units)		(ug/L-ppb)	(ug/L-ppb)			(ug/L-ppb)
Bis(2-ethylhexyl) phthalate	ND	0.390	ND	0.390	~	ND
Di-n-octyl phthalate	ND	0.270	ND	0.270	~	ND
Benzo[b]fluoranthene	ND	0.340	ND	0.340	~	ND
Benzo[k]fluoranthene	ND	0.400	ND	0.400	~	ND
Benzo[a]pyrene	ND	0.290	ND	0.290	~	ND
Indeno[1,2,3-cd]pyrene	ND	0.250	ND	0.250	~	ND
Dibenz[a,h]anthracene	ND	0.240	ND	0.240	~	ND
Benzo[g,h,i]perylene	ND	0.265	ND	0.265	~	ND
TOTAL BNA'S:	29.6	ND			ND	
PCB's (Units)		(ug/L-ppb)	(ug/L-ppb)			(ug/L-ppb)
Aroclor-1016	ND	0.020	ND	0.020	~	ND
Aroclor-1221	ND	0.020	ND	0.020	~	ND
Aroclor-1232	ND	0.020	ND	0.020	~	ND
Aroclor-1242	ND	0.020	ND	0.020	~	ND
Aroclor-1248	ND	0.020	ND	0.020	~	ND
Aroclor-1254	ND	0.020	ND	0.020	~	ND
Aroclor-1260	ND	0.020	ND	0.020	~	ND
Metals (Units)		(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	(ug/L-ppb)	
Aluminum	ND	40.0	95.0	40.0	ND	94.5
Antimony	ND	4.00	ND	4.00	ND	4.00
Arsenic	3.91	2.00	ND	2.00	ND	2.00
Barium	55.4	40.0	ND	40.0	ND	40.0
Beryllium	ND	1.00	ND	1.00	ND	1.00
Cadmium	ND	1.00	ND	1.00	ND	1.00
Calcium	16100	200	11800	200	10100	200
Chromium	ND	8.00	ND	8.00	ND	8.00
Cobalt	ND	8.00	ND	8.00	ND	8.00
Copper	ND	8.00	ND	8.00	ND	8.00
Iron	27600	100	463	100	1120	100
Lead	ND	2.00	ND	2.00	ND	2.00
Magnesium	2890	200	3110	200	2630	200
Manganese	460	4.00	42.4	4.00	29.0	4.00
Mercury	ND	0.500	ND	0.500	ND	0.500
Nickel	16.2	4.00	16.2	4.00	16.2	4.00
Potassium	5310	200	5350	200	5520	200
Selenium	ND	8.00	ND	8.00	ND	8.00
Silver	ND	2.00	ND	2.00	ND	2.00
Sodium	40700	400	130000	400	130000	400
Thallium	ND	0.400	ND	0.400	ND	0.400
Vanadium	ND	8.00	ND	8.00	ND	8.00
Zinc	15.1	8.00	16.5	8.00	13.3	8.00
General Analytical (Units)						
Field Conductivity(ms/cm)	0.434	NA	0.717	NA	~	~
Field DO(mg/L)	1.36	NA	3.92	NA	~	~
Field Temperature(°C)	17.92	NA	21.27	NA	~	~
Field pH(S.U.)	5.91	NA	7.09	NA	~	~
Flow(gpm)	3.3	NA	20.1	NA	~	~
Field Turbidity(N.T.U.)	0	NA	0	NA	~	~
Field ORP(mV)	-101	NA	222	NA	~	~

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

SUMMARY REPORT

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MO. - 41554979.1023
Lab Case No.: E08-13792

Lab ID:	13792-005	Lab ID:	13792-006	Lab ID:	13792-007	Lab ID:	13792-008					
Client ID:	29-FB120208-93	Client ID:	29-TB120108-93	Client ID:	29-PS1-93	Client ID:	29-PS6-93					
Matrix:	Aqueous	Matrix:	Aqueous	Matrix:	Aqueous	Matrix:	Aqueous					
Sampled Date	12/2/08	Sampled Date	12/1/08	Sampled Date	12/1/08	Sampled Date	12/1/08					
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)												
	<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>		
Carbon tetrachloride	ND	0.410		ND	0.410		ND	0.410		ND	0.410	
1,2-Dichloroethane (EDC)	ND	0.100		ND	0.100		ND	0.100		ND	0.100	
Benzene	ND	0.280		ND	0.280		43.2	0.280		ND	0.280	
Trichloroethene	ND	0.300		ND	0.300		ND	0.300		ND	0.300	
1,2-Dichloropropane	ND	0.220		ND	0.220		ND	0.220		ND	0.220	
Bromodichloromethane	ND	0.150		ND	0.150		ND	0.150		ND	0.150	
2-Chloroethyl vinyl ether	ND	0.150		ND	0.150		ND	0.150		ND	0.150	
cis-1,3-Dichloropropene	ND	0.210		ND	0.210		ND	0.210		ND	0.210	
Toluene	ND	0.300		ND	0.300		4.92	0.300		ND	0.300	
trans-1,3-Dichloropropene	ND	0.150		ND	0.150		ND	0.150		ND	0.150	
1,1,2-Trichloroethane	ND	0.110		ND	0.110		ND	0.110		ND	0.110	
Tetrachloroethene	ND	0.380		ND	0.380		ND	0.380		ND	0.380	
Dibromochloromethane	ND	0.150		ND	0.150		ND	0.150		ND	0.150	
Chlorobenzene	ND	0.260		ND	0.260		ND	0.260		ND	0.260	
Ethylbenzene	ND	0.320		ND	0.320		52.1	0.320		ND	0.320	
Total Xylenes	ND	0.850		ND	0.850		71.1	0.850		ND	0.850	
Bromoform	ND	0.160		ND	0.160		ND	0.160		ND	0.160	
1,1,2,2-Tetrachloroethane	ND	0.180		ND	0.180		ND	0.180		ND	0.180	
1,3-Dichlorobenzene	ND	0.230		ND	0.230		ND	0.230		ND	0.230	
1,4-Dichlorobenzene	ND	0.250		ND	0.250		ND	0.250		ND	0.250	
1,2-Dichlorobenzene	ND	0.230		ND	0.230		ND	0.230		ND	0.230	
TOTAL VO's:	ND			ND			205.09			ND		
Semivolatiles - BNA (Units)		<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>	
N-Nitrosodimethylamine	ND	0.180		~	~		ND	0.180		ND	0.180	
Phenol	ND	0.150		~	~		ND	0.150		ND	0.150	
Aniline	ND	0.230		~	~		ND	0.230		ND	0.230	
Bis(2-chloroethyl) ether	ND	0.130		~	~		ND	0.130		ND	0.130	
2-Chlorophenol	ND	0.090		~	~		ND	0.090		ND	0.090	
1,3-Dichlorobenzene	ND	0.200		~	~		ND	0.200		ND	0.200	
1,4-Dichlorobenzene	ND	0.130		~	~		ND	0.130		ND	0.130	
Benzyl alcohol	ND	0.180		~	~		ND	0.180		ND	0.180	
1,2-Dichlorobenzene	ND	0.080		~	~		ND	0.080		ND	0.080	
2-Methylphenol	ND	0.090		~	~		ND	0.090		ND	0.090	
Bis(2-chloroisopropyl) ether	ND	0.130		~	~		ND	0.130		ND	0.130	
4-Methylphenol	ND	0.160		~	~		ND	0.160		ND	0.160	
N-Nitrosodi-n-propylamine	ND	0.150		~	~		ND	0.150		ND	0.150	
Hexachloroethane	ND	0.290		~	~		ND	0.290		ND	0.290	
Nitrobenzene	ND	0.130		~	~		ND	0.130		ND	0.130	
Isophorone	ND	0.120		~	~		ND	0.120		ND	0.120	
2-Nitrophenol	ND	0.180		~	~		ND	0.180		ND	0.180	
2,4-Dimethylphenol	ND	0.110		~	~		ND	0.110		ND	0.110	
Bis(2-chloroethoxy) methane	ND	0.100		~	~		ND	0.100		ND	0.100	

ND = Analyzed for but Not Detected at the MDL

~ = Sample not analyzed for

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MO. - 41554979.1023
Lab Case No.: E08-13792

PARAMETER(Units)	Lab ID:	13792-005			13792-006			13792-007			13792-008			
	Client ID:	29-FB120208-93			29-TB120108-93			29-PS1-93			29-PS6-93			
	Matrix:	Aqueous 12/2/08			Aqueous 12/1/08			Aqueous 12/1/08			Aqueous 12/1/08			
PARAMETER(Units)	Sampled Date	Conc	Q	MDL										
Semivolatiles - BNA (Units)			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>			<i>(ug/L-ppb)</i>		
Benzoic acid		ND	0.240		~		~	ND	0.240		ND	0.240		
2,4-Dichlorophenol		ND	0.190		~		~	ND	0.190		ND	0.190		
1,2,4-Trichlorobenzene		ND	0.150		~		~	ND	0.150		ND	0.150		
Naphthalene		ND	0.168		~		~	12.8	0.168		ND	0.168		
4-Chloroaniline		ND	0.110		~		~	ND	0.110		ND	0.110		
Hexachlorobutadiene		ND	0.200		~		~	ND	0.200		ND	0.200		
4-Chloro-3-methylphenol		ND	0.160		~		~	ND	0.160		ND	0.160		
2-Methylnaphthalene		ND	0.139		~		~	7.03	0.139		ND	0.139		
Hexachlorocyclopentadiene		ND	0.090		~		~	ND	0.090		ND	0.090		
2,4,6-Trichlorophenol		ND	0.160		~		~	ND	0.160		ND	0.160		
2,4,5-Trichlorophenol		ND	0.330		~		~	ND	0.330		ND	0.330		
2-Chloronaphthalene		ND	0.210		~		~	ND	0.210		ND	0.210		
2-Nitroaniline		ND	0.310		~		~	ND	0.310		ND	0.310		
Dimethyl phthalate		ND	0.140		~		~	ND	0.140		ND	0.140		
2,6-Dinitrotoluene		ND	0.500		~		~	ND	0.500		ND	0.500		
Acenaphthylene		ND	0.715		~		~	ND	0.715		ND	0.715		
3-Nitroaniline		ND	0.170		~		~	ND	0.170		ND	0.170		
Acenaphthene		ND	0.131		~		~	ND	0.131		ND	0.131		
2,4-Dinitrophenol		ND	0.150		~		~	ND	0.150		ND	0.150		
4-Nitrophenol		ND	0.210		~		~	ND	0.210		ND	0.210		
2,4-Dinitrotoluene		ND	0.170		~		~	ND	0.170		ND	0.170		
Dibenzofuran		ND	0.200		~		~	0.297	0.200		ND	0.200		
Diethyl phthalate		ND	0.170		~		~	ND	0.170		ND	0.170		
Fluorene		ND	0.126		~		~	ND	0.126		ND	0.126		
4-Chlorophenyl phenyl ether		ND	0.160		~		~	ND	0.160		ND	0.160		
4-Nitroaniline		ND	0.090		~		~	ND	0.090		ND	0.090		
4,6-Dinitro-2-methylphenol		ND	0.150		~		~	ND	0.150		ND	0.150		
N-Nitrosodiphenylamine		ND	0.360		~		~	ND	0.360		ND	0.360		
1,2-Diphenylhydrazine		ND	0.160		~		~	ND	0.160		ND	0.160		
4-Bromophenyl phenyl ether		ND	0.190		~		~	ND	0.190		ND	0.190		
Hexachlorobenzene		ND	0.190		~		~	ND	0.190		ND	0.190		
Pentachlorophenol		ND	0.170		~		~	ND	0.170		ND	0.170		
Phenanthrene		ND	0.130		~		~	ND	0.130		ND	0.130		
Anthracene		ND	0.644		~		~	ND	0.644		ND	0.644		
Carbazole		ND	0.113		~		~	ND	0.113		ND	0.113		
Di-n-butyl phthalate		ND	0.350		~		~	ND	0.350		ND	0.350		
Fluoranthene		ND	0.070		~		~	ND	0.070		ND	0.070		
Benzidine		ND	0.153		~		~	ND	0.153		ND	0.153		
Pyrene		ND	0.130		~		~	ND	0.130		ND	0.130		
3,3'-Dimethylbenzidine		ND	0.240		~		~	ND	0.240		ND	0.240		
Butyl benzyl phthalate		ND	0.140		~		~	ND	0.140		ND	0.140		
3,3'-Dichlorobenzidine		ND	0.290		~		~	ND	0.290		ND	0.290		
Benzo[a]anthracene		ND	0.120		~		~	ND	0.120		ND	0.120		

ND = Analyzed for but Not Detected at the MDL

~ = Sample not analyzed for

Continued on Next Page

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: URS Construction Services
Project: AREA 29 MO. - 41554979.1023
Lab Case No.: E08-13792

PARAMETER(Units)	Lab ID:	13792-005			13792-006			13792-007			13792-008		
	Client ID:	29-FB120208-93			29-TB120108-93			29-PS1-93			29-PS6-93		
Sampled Date	Matrix:	Aqueous			Aqueous			Aqueous			Aqueous		
		Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Semivolatiles - BNA (Units)		(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)		
Chrysene		ND	0.146		~		~	ND	0.146		ND	0.146	
Bis(2-ethylhexyl) phthalate		ND	0.200		~		~	ND	0.200		ND	0.200	
Di-n-octyl phthalate		ND	0.390		~		~	ND	0.390		ND	0.390	
Benzo[b]fluoranthene		ND	0.940		~		~	ND	0.940		ND	0.940	
Benzo[k]fluoranthene		ND	0.180		~		~	ND	0.180		ND	0.180	
Benzo[a]pyrene		ND	0.110		~		~	ND	0.110		ND	0.110	
Indeno[1,2,3-cd]pyrene		ND	0.150		~		~	ND	0.150		ND	0.150	
Dibenz[a,h]anthracene		ND	0.100		~		~	ND	0.100		ND	0.100	
Benzo[g,h,i]perylene		ND	0.225		~		~	ND	0.225		ND	0.225	
TOTAL BNA'S:		ND			~		~	20.1			ND		
PCB's (Units)		(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)		
Aroclor-1016		ND	0.020		~		~	ND	0.020		ND	0.020	
Aroclor-1221		ND	0.020		~		~	ND	0.020		ND	0.020	
Aroclor-1232		ND	0.020		~		~	ND	0.020		ND	0.020	
Aroclor-1242		ND	0.020		~		~	ND	0.020		ND	0.020	
Aroclor-1248		ND	0.020		~		~	ND	0.020		ND	0.020	
Aroclor-1254		ND	0.020		~		~	ND	0.020		ND	0.020	
Aroclor-1260		ND	0.020		~		~	ND	0.020		ND	0.020	
Metals (Units)		(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)			(ug/L-ppb)		
Aluminum		ND	40.0		~		~	ND	40.0		ND	40.0	
Antimony		ND	4.00		~		~	ND	4.00		ND	4.00	
Arsenic		ND	2.00		~		~	ND	2.00		ND	2.00	
Barium		ND	40.0		~		~	49.2	40.0		ND	40.0	
Beryllium		ND	1.00		~		~	ND	1.00		ND	1.00	
Cadmium		ND	1.00		~		~	ND	1.00		ND	1.00	
Calcium		ND	200		~		~	14200	200		11500	200	
Chromium		ND	8.00		~		~	ND	8.00		ND	8.00	
Cobalt		ND	8.00		~		~	ND	8.00		ND	8.00	
Copper		ND	8.00		~		~	ND	8.00		ND	8.00	
Iron		ND	100		~		~	26000	100		141	100	
Lead		ND	2.00		~		~	ND	2.00		ND	2.00	
Magnesium		ND	200		~		~	2600	200		2750	200	
Manganese		ND	4.00		~		~	412	4.00		14.3	4.00	
Mercury		ND	0.500		~		~	ND	0.500		ND	0.500	
Nickel		ND	4.00		~		~	ND	4.00		ND	4.00	
Potassium		ND	200		~		~	4590	200		4740	200	
Selenium		ND	8.00		~		~	ND	8.00		ND	8.00	
Silver		ND	2.00		~		~	ND	8.00		ND	8.00	
Sodium		ND	400		~		~	34400	400		118000	400	
Thallium		ND	0.400		~		~	ND	0.400		ND	0.400	
Vanadium		ND	8.00		~		~	ND	8.00		ND	8.00	
Zinc		ND	8.00		~		~	12.0	8.00		15.3	8.00	
General Analytical (Units)													
Field Conductivity(ms/cm)		~		~		~		0.373		NA	0.607		NA
Field DO(mg/L)		~		~		~		2.53		NA	3.16		NA
Field Temperature(°C)		~		~		~		15.55		NA	18.86		NA
Field pH(S.U.)		~		~		~		6.35		NA	6.97		NA
Field Flow(gpm)		~		~		~		3.3		NA	20.8		NA
Field Turbidity(n.t.u.)		~		~		~		0		NA	0		NA
Field ORP(mV)		~		~		~		-55		NA	440		NA

~ = Sample not analyzed for

ND = Analyzed for but Not Detected at the MDL

Butlien, Larry (Windsor,CT-US)

From: Butlien, Larry (Windsor,CT-US)
Sent: Friday, February 06, 2009 10:37 AM
To: Hay, David (Littleton,CO-US)
Subject: Area 29 Baseline Na

Dave:

Here is the Area 29 baseline sodium concentrations for both influent and effluent.

February 9, 2004 – Influent – 6,450 ug/L; Effluent – 17,500 ug/L

February 12, 2004 – Influent – 6,390 ug/L; Effluent – 133,000 ug/L

February 18, 2004 – Influent – 5,090 ug/L; Effluent – 184,000 ug/L

February 26, 2004 – Influent – 4,820 ug/L; Effluent – 202,000 ug/L

Note that this was during the treatment system shakedown period where they were “tweaking” the system resulting in variable effluent concentrations.

Larry Butlien, L.E.P.
Sr. Project Manager/Hydrogeologist



21 Griffin Road North
Windsor, CT 06095

(860) 298-9692 main phone
(860) 298-6225 direct line
(860) 298-6399 fax
lbutlien@trcsolutions.com

From: Butlien, Larry (Windsor,CT-US)
Sent: Thursday, February 05, 2009 8:11 PM
To: Hay, David (Littleton,CO-US)
Subject: FW: Area B - August 2008 GW sample data

Dave:

See the attached lab reports for the sodium concentrations of the Area 29 influent (29-PS-1..) for the time period May 2008 through December 2008. Bill will forward the September results once he finds the September report. Also, I believe that 29-PS-6.. is the sample identifier for the effluent. Lastly, I'll send the February 2004 influent data (baseline) in a separate email tomorrow.

Larry

-----Original Message-----

From: william.ctr.fuetterer@faa.gov [mailto:william.ctr.fuetterer@faa.gov]
Sent: Thu 2/5/2009 4:22 PM
To: Butlien, Larry (Windsor,CT-US)
Cc:
Subject: RE: Area B - August 2008 GW sample data

Larry,

Here are the Area 29 PS1 sample results from April - December. I need to locate my September report. I recall that the sampling changed from PP Metals to TAL Metals in May 2008.

Enjoy!

/s/

Bill

William B. Fuetterer, Northrop Grumman-NISC Bridge
FAA William J. Hughes Technical Center
Environmental & Safety Sub-Team (AJP-7932)
Atlantic City International Airport
Atlantic City, NJ 08405
Work - (609) 485-5314
Fax - (609) 485-6102
email - william.ctr.fuetterer@faa.gov

APPENDIX B

HISTORICAL METALS CONCENTRATIONS IN 29-MW16S, 29-MW17S, 29-MW18S, AND 29-MW19S

TABLE 12B
Historical Metals Detected in Groundwater Monitoring Wells
Area 29 - William J. Hughes Technical Center

WELL	DATE	Aluminum	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Sodium	Zinc
	NJPQL	1510	21.3(1)	2.00	21.8(1)	2910(1)	11.3(1)	31.2(1)	0.5	10.00	2340.0	43.8*
29-MW-16S												
	02/06/02(2)	NR	ND	NR	3.3	NR	ND	NR	ND	2.9	NR	ND
	05/21/03(2)	655	ND	ND	ND	915	ND	18.9	ND	3.2	1850	11.9
	02/23/04	184J	<4.00	<1.00	<0.00	<100	<2.00	<20.0	<0.5	<4.00	2160	14.2J
	04/19/04	126	<4.00	<1.00	12.9	233	<2.00	9.61	<0.5	45.6	1770	11.2
	07/19/04	<40.0	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	<400	16.4J
	10/16/04	260	<4.00	<1.00	<0.00	162	<2.00	16.3	<0.5	<4.00	2140	11.6J
	12/19/04	248	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	1890	16
	01/12/05	160	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	1760	21.8
	02/02/05	131	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	1820	<8.00
	03/09/05	488	<4.00	<1.00	<0.00	258	<2.00	5.31	<0.5	10.9	1880	25.5
	04/05/05	85.5	<4.00	<1.00	<0.00	<100	<2.00	6.76	<0.5	6.44	1800	12.7
	05/12/05	315	<4.00	<1.00	<0.00	120	<2.00	5.50	<0.5	6.00	1870	14.0
	06/28/05	142	<4.00	<1.00	<0.00	<100	<2.00	<20.0	<0.5	8.30	2010	<8.00
	07/12/05	359	<4.00	<1.00	8.28	108	<2.00	5.38	<0.5	7.09	1620	12.7
	08/09/05	269	<4.00	<1.00	10.5	<100	<2.00	5.3	<0.5	9	2010	<8.00
	09/07/05	142	<4.00	<1.00	47.4	<100	<2.00	4.45	<0.5	8.79	1670	<8.00
	10/03/05	202	<4.00	<1.00	17.9	127	<2.00	5.59	<0.5	14.3	1960	6.2
	11/01/05	213	<4.00	<1.00	9.74	301	<2.00	5.28	<0.5	10.6	2000	10.9
	12/01/05	214	<4.00	<1.00	<0.00	175	<2.00	4.72	<0.5	5.96	2080	<8.00
	01/05/06	212	<4.00	<1.00	<0.00	<100	<2.00	4.1	<0.5	<4.0	1800	<8.00
	02/01/06	154	<4.00	<1.00	<0.00	<100	<2.00	4.22	<0.5	4.01	1850	<8.00
	03/01/06	145	<4.00	<1.00	<0.00	<100	<2.00	4.86	<0.5	7.3	1910	11.5
	04/04/06	628	<4.00	<1.00	<0.00	<100	<2.00	8.18	<0.5	12.9	2250	11.4
	05/02/06	122	<4.00	<1.00	<0.00	<100	<2.00	6.3	<0.5	13	1780	<8.00
	06/08/06	247	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	1770	9.7
	07/05/06	247	<4.00	<1.00	<0.00	<100	<2.00	4.32	<0.5	5.31	1940	<8.00
	08/01/06	176	<4.00	<1.00	<0.00	<100	<2.00	4.08	<0.5	<4.00	1820	14.9
	09/07/06	122	<4.00	<1.00	<0.00	<100	<2.00	4.01	<0.5	<4.00	2020	12.6
	10/05/06	122	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	2000	12.5
	11/02/06	134	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	2180	13.3
	12/07/06	68.1	<4.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	2240	16.2
	01/04/07	93.7	<4.00	<1.00	<0.00	<100	<2.00	6.4	<0.5	<4.00	2270	16.5
	02/01/07	120	<4.00	<1.00	<0.00	<100	<2.00	5.62	<0.5	<4.00	2230	15.8
	03/01/07	82.5	<4.00	<1.00	<0.00	<100	<2.00	4.59	<0.5	<4.00	1980	14.5
	04/03/07	129	<4.00	<1.00	<0.00	<100	<2.00	4.89	<0.5	<4.00	2020	<11.8
	05/01/07	168	<4.00	<1.00	<0.00	<100	<2.00	6.72	<0.5	<4.00	2230	<14.7
	06/01/07	<141	<4.00	<1.00	<0.00	<100	<2.00	5.20	<0.5	<4.00	2160	<15.2
	07/03/07	603	<4.00	<1.00	<0.00	344	<2.00	4.0	<0.5	<4.00	1830	<12.2
	08/01/07	<138	<4.00	<1.00	<0.00	<100	<2.00	4.23	<0.5	<4.00	<1950	<15.5
	09/04/07	154	<4.00	<1.00	<0.00	<100	<2.00	5.27	<0.5	<4.00	2160	<10.6
	10/01/07	492	<4.00	<1.00	<0.00	311	<2.00	<4	<0.5	<4.00	2040	<10.6
	11/04/07	860	<4.00	<1.00	<0.00	454	<2.00	<4	<0.5	<4.00	1870	9.12
	12/03/07	278	<4.00	<1.00	<0.00	<100	<2.00	4.39	<0.5	<4.00	1880	41.3
	01/03/08	385	<2.00	<1.00	<0.00	114	<2.00	<4.00	<0.5	<4.00	1970	<12.2 U
	02/05/08	127	<2.00	<1.00	<0.00	129 U	<2.00	<4.00	<0.5	<4.00	2260	13.0 U
	03/03/08	202	<2.00	<1.00	<0.00	<100	<2.00	<5.39 U	<0.5	<4.00	1820	<14.3 U
	04/03/08	209	<2.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	1740	17.3
	05/01/08	57	<2.00	<1.00	<0.00	<100	<2.00	623	<0.5	<4.00	1900	<8.00
	06/01/08	105	<2.00	<1.00	<0.00	<100	<2.00	<4.00	<0.5	<4.00	1880	14.6
29-MW-17S												
	02/06/02(2)	NR	15.5	NR	18.1	NR	11.3	NR	ND	7.5	NR	43.8
	05/21/03(2)	1510	ND	ND	3.1	2910	ND	31.2	ND	4.9	2340	22.8
	02/23/04	2870	<4.00	<1.00	<8.00	1370	<2.00	<20.0	<0.5	<4.00	2230	23.1J
	04/19/04	83.5	<4.00	<1.00	<8.00	104	<2.00	10.9	<0.5	18.3	1910	20.4
	07/19/04	<40.0	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	<400	17.3J
	10/18/04	178	<4.00	<1.00	<8.00	<100	<2.00	6.30	<0.5	<4.00	2190	14.5J
	12/16/04	748	<4.00	<1.00	<8.00	843	<2.00	8.61	<0.5	<4.00	2090	35
	01/12/05	83.3	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	1840	24.7
	02/02/05	<40.0	<4.00	<1.00	<8.00	<100	<2.00	4.31	<0.5	<4.00	2170	13.2
	03/09/05	532	<4.00	<1.00	<8.00	139	<2.00	6.65	<0.5	10.7	2030	20.1
	04/05/05	86.3	<4.00	<1.00	<8.00	139	<2.00	5.38	<0.5	4.66	1750	16.1
	05/12/05	.118	<4.00	<1.00	<8.00	<100	<2.00	7.50	<0.5	9.41	2000	19.2
	03/28/05	163	<4.00	<1.00	11.0	118	<2.00	<20.0	<0.5	20.0	2010	13.0
	07/12/05	638	<4.00	<1.00	23.5	583	<2.00	12.2	<0.5	28.8	1930	17.5
	08/09/05	175	<4.00	<1.00	9.11	<100	<2.00	5.7	<0.5	11.1	2330	12.5
	08/07/05	214	<4.00	<1.00	14.6	<100	<2.00	8.31	<0.5	19.2	1700	16.4
	10/03/05	343	<4.00	<1.00	30.9	388	<2.00	13.1	<0.5	34.6	1890	16.4

TABLE 12B
Historical Metals Detected in Groundwater Monitoring Wells
Area 29 - William J. Hughes Technical Center

WELL	DATE	Aluminum	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Sodium	Zinc	
	NJPOL	1510	21.3(1)	2.00	21.8(1)	2810(1)	11.3(1)	31.2(1)	0.5	10.00	2340.0	43.9*	
	11/01/05	157	<4.00	<1.00	10.8	321	<2.00	7.31	<0.5	13.3	1920	16.1	
	12/01/05	200	<4.00	<1.00	14.8	129	<2.00	5.34	<0.5	8.34	2020	9.74	
	01/05/06	268	<4.00	<1.00	<8.00	<100	<2.00	4.4	<0.5	4.92	1870	9.73	
	02/01/06	88.5	<4.00	<1.00	<8.00	<100	<2.00	<4.0	<0.5	5.4	1830	12.4	
	03/01/06	151	<4.00	<1.00	<8.00	<100	<2.00	6.58	<0.5	6.11	2130	12.6	
	04/04/06	363	<4.00	<1.00	<8.00	<100	<2.00	8.26	<0.5	11.7	2260	16.7	
	05/02/06	105	<4.00	<1.00	<8.00	<100	<2.00	6.91	<0.5	8.27	1800	11	
	06/08/06	297	<4.00	<1.00	<8.00	<100	<2.00	6.37	<0.5	5.63	1760	14.6	
	07/05/06	278	<4.00	<1.00	<8.00	<100	<2.00	6.85	<0.5	6.05	1950	14	
	08/01/06	102	<4.00	<1.00	<8.00	<100	<2.00	6.77	<0.5	5.67	2030	16.4	
	09/07/06	129	<4.00	<1.00	<8.00	<100	<2.00	6.2	<0.5	<4.0	2000	16.5	
	10/05/06	108	<4.00	<1.00	<8.00	<100	<2.00	<4.0	<0.5	<4.0	2240	10.4	
	11/02/06	<40	<4.00	<1.00	<8.00	<100	<2.00	<4.0	<0.5	<4.0	1920	22	
	12/07/06	60.3	<4.00	<1.00	<8.00	<100	<2.00	6.37	<0.5	<4.00	2160	13.8	
	01/04/07	88.4	<4.00	<1.00	<8.00	<100	<2.00	8.21	<0.5	<4.00	2500	16.5	
	02/01/07	99	<4.00	<1.00	<8.00	<100	<2.00	<4	<0.5	<4.00	2080	<13.9	
	03/01/07	75.3	<4.00	<1.00	<8.00	<100	<2.00	4.81	<0.5	<4.00	2220	16.2	
	04/03/07	52.3	<4.00	<1.00	<8.00	<100	<2.00	4.89	<0.5	<4.00	2020	<15.7	
	05/01/07	185	<4.00	<1.00	<8.00	<100	<2.00	6.79	<0.5	<4.00	2340	<18.1	
	06/01/07	257	<4.00	<1.00	<8.00	<100	<2.00	6.32	<0.5	<4.00	2320	<6.49	
	07/05/07	185	<4.00	<1.00	<8.00	119	<2.00	4.35	<0.5	<4.00	2120	<8.96	
	08/01/07	ND	<4.00	<1.00	<8.00	<100	<2.00	4.1	<0.5	<4.00	2280	<43.3	
	09/04/07	202	<4.00	<1.00	<8.00	<100	<2.00	7.03	<0.5	<4.00	2390	<12.5	
	10/01/07	160	<4.00	<1.00	<8.00	107	<2.00	<4	<0.5	<4.00	1940	11.9	
	11/04/07	255	<4.00	<1.00	<8.00	131	<2.00	<4	<0.5	<4.00	1920	9.62	
	12/03/07	215	<4.00	<1.00	<8.00	125	<2.00	<4	<0.5	<4.00	2100	42.4	
	01/03/08	108	<2.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	2190	<12.0 U	
	02/05/08	145	<2.00	<1.00	<8.00	127 U	<2.00	<4.00	<0.5	<4.00	2430 U	12.2 U	
	03/03/08	91.4	<2.00	<1.00	<8.00	<100	<2.00	10.8	<0.5	<4.00	1840	<29.9 U	
	04/03/08	389	<2.00	<1.00	<8.00	249	<2.00	8.67	<0.5	<4.00	4090	20.2	
	05/01/08	85	<2.00	<1.00	<8.00	<100	<2.00	5.74	388	<0.5	<4.00	2810	11.1
	06/01/08	103	<2.00	<1.00	<8.00	<100	<2.00	5.84	<4.00	<0.5	<4.00	2350	11.9
29-MW-18S													
	02/06/02(1)	NR	21.3	NR	21.8	NR	11	NR	ND	4.1	NR	27.3	
	05/21/03(1)	1270	ND	ND	2.3	2320	ND	7.2	ND	ND	1920	ND	
	02/23/04	775	<4.00	<1.00	<8.00	348	<2.00	<20.0	<0.5	<4.00	2320	15.6	
	04/20/04	89	<4.00	<1.00	<8.00	<100	<2.00	5.8	<0.5	7.3	1800	<8.00	
	07/19/04	<40.0	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	<400	<8.00	
	10/19/04	372	<4.00	<1.00	<8.00	173	2.32	6.60	<0.5	<4.00	2240	11.2 J	
	12/19/04	534	<4.00	<1.00	<8.00	<100	<2.00	5.59	<0.5	<4.00	2680	18.8	
	01/12/05	91.6	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	2120	11.1	
	02/02/05	322	<4.00	<1.00	<8.00	138	<2.00	6.51	<0.5	<4.00	2440	26.6	
	03/08/05	354	123	5.14	<8.00	<100	<2.00	5.14	<0.5	<4.00	2340	11.3	
	04/05/05	40.0	<4.00	<1.00	<8.00	<100	<2.00	8.17	<0.5	4.59	1940	<8.00	
	05/12/05	140	<4.00	<1.00	8.61	<100	<2.00	6.87	<0.5	9.77	2520	10.1	
	06/20/05	172	<4.00	<1.00	8.71	<100	<2.00	<20.0	<0.5	8.4	2370	<8.00	
	07/12/05	330	<4.00	<1.00	8.45	158	<2.00	6.11	<0.5	8.17	2080	<8.00	
	08/09/05	455	<4.00	<1.00	<8.00	287	<2.00	5.85	<0.5	5.58	2760	8.11	
	09/07/05	<40.0	<4.00	<1.00	13.3	<100	<2.00	6.4	<0.5	13.4	1970	<8.00	
	10/03/05	135	<4.00	<1.00	<8.00	<100	<2.00	5.92	<0.5	8.3	2460	10	
	11/01/05	197	<4.00	<1.00	<8.00	213	<2.00	6.08	<0.5	8.15	2130	9.18	
	12/01/05	185	<4.00	<1.00	<8.00	<100	<2.00	7.1	<0.5	<4.00	2910	<8.00	
	01/08/06	185	<4.00	<1.00	<8.00	<100	<2.00	7.1	<0.5	<4.00	2910	<8.00	
	02/01/06	171	<4.00	<1.00	<8.00	<100	<2.00	7.34	<0.5	<4.00	1050	<8.00	
	03/01/06	119	<4.00	<1.00	<8.00	<100	<2.00	7.11	<0.5	<4.00	2330	8.24	
	04/04/06	101	<4.00	<1.00	<8.00	<100	<2.00	8.29	<0.5	4.11	2230	<8.00	
	05/02/06	255	<4.00	<1.00	<8.00	<100	<2.00	6.6	<0.5	7.88	2150	9.7	
	06/08/06	164	<4.00	<1.00	<8.00	<100	<2.00	6.58	<0.5	<4.00	2200	8.82	
	07/05/06	65.3	<4.00	<1.00	<8.00	<100	<2.00	6.31	<0.5	<4.00	2310	<8.0	
	08/01/06	47	<4.00	<1.00	<8.00	<100	<2.00	5.82	<0.5	<4.00	2280	9.22	
	09/07/06	101	<4.00	<1.00	<8.00	<100	<2.00	7.88	<0.5	<4.00	2990	10.8	
	10/05/06	88.8	<4.00	<1.00	<8.00	<100	<2.00	7.18	<0.5	<4.00	3080	11.2	
	11/02/06	94.6	<4.00	<1.00	<8.00	<100	<2.00	8.03	<0.5	<4.00	3080	13.2	
	12/07/06	63.7	<4.00	<1.00	<8.00	<100	<2.00	<4	<0.5	<4.00	3320	13.31	
	01/04/07	46.7	<4.00	<1.00	<8.00	<100	<2.00	<4	<0.5	<4.00	3530	<14.9	
	02/01/07	<40	<4.00	<1.00	<8.00	<100	<2.00	<4	<0.5	<4.00	2310	<10.6	
	03/01/07	<40	<4.00	<1.00	<8.00	<100	<2.00	4.24	<0.5	<4.00	2120	<33.1	
	04/03/07	48.4	<4.00	<1.00	<8.00	<100	<2.00	4.34	<0.5	<4.00	2590	<10.6	

TABLE 12B
Historical Metals Detected in Groundwater Monitoring Wells
Area 29 - William J. Hughes Technical Center

WELL	DATE	Aluminum	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Sodium	Zinc
NJPQL	15/10	21.3 ⁽¹⁾	2.00	21.8 ⁽¹⁾	2910 ⁽¹⁾	11.3 ⁽¹⁾	31.2 ⁽¹⁾	0.5	10.00	2340.0	43.9 [*]	
	05/01/07	87.4	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	2480	<10.7
	08/01/07	ND	<4.00	<1.00	<8.00	<100	<2.00	4.17	<0.5	<4.00	2890	<13.8
	07/05/07	112	<4.00	<1.00	<8.00	<100	<2.00	<4.0	<0.5	<4.00	2390	<8.0
	08/01/07	ND	<4.00	<1.00	<8.00	<100	<2.00	NR	<0.5	<4.00	2090	<13.3
	09/04/07	202	<4.00	<1.00	<8.00	<100	<2.00	7.03	<0.5	<4.00	2390	<11.9
	10/01/07	68.8	<4.00	<1.00	<8.00	<100	<2.00	<4	<0.5	<4.00	2240	.12
	11/01/07	78.5	<4.00	<1.00	<8.00	<100	<2.00	8.18	<0.5	<4.00	2860	<8
	12/03/07	92.7	<4.00	<1.00	<8.00	<100	<2.00	5.27	<0.5	<4.00	4930	18.4
	01/03/08	88.8	<2.00	<1.00	<8.00	<100	<2.00	5.44	<0.5	<4.00	2610	<8.72 U
	02/05/08	172	<2.00	<1.00	<8.00	137 U	<2.00	8.71	<0.5	<4.00	2750	18.3 U
	03/03/08	50.9	<2.00	<1.00	<8.00	<100	<2.00	<9.89 U	<0.5	<4.00	1990	<15.1 U
	04/03/08	289	<2.00	<1.00	<8.00	142	<2.00	8.45	<0.5	<4.0	3190	13.5
	05/01/08	40.8	<2.00	<1.00	<8.00	<100	6.53	1230	<0.5	<4.00	3280	9.8
	06/01/08	110	<2.00	<1.00	<8.00	<100	5.87	1230	<0.5	<4.00	2970	21.5
29-MW-19S												
	02/06/02 ⁽¹⁾	NR	8.1	NR	4.7	NR	3.5	NR	ND	ND	NR	ND
	05/21/03 ⁽¹⁾	664	ND	ND	2.2	1730	ND	9.7	ND	ND	2110	ND
	02/23/04	1780	<4.00	<1.00	<8.00	1100	<2.00	<20.0	<0.5	<4.00	2340	14.7J
	04/21/04	126	<4.00	<1.00	<8.00	<100	<2.00	6.89	<0.5	7.87	2100	8.9J
	07/19/04	<40.0	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	<400	8.88J
	10/18/04	93.4	<4.00	<1.00	<8.00	<100	<2.00	8.87	<0.5	<4.00	2180	9.00J
	12/18/04	365	<4.00	<1.00	<8.00	226	<2.00	4.84	<0.5	4.98	2280	16.5
	01/12/05	236	<4.00	<1.00	<8.00	244	<2.00	4.13	<0.5	<4.00	2250	10.9
	02/02/05	108	<4.00	<1.00	<8.00	<100	<2.00	5.44	<0.5	<4.00	2310	8.38
	03/09/05	5770	<4.00	<1.00	211	5380	<2.00	31.9	<0.5	169	2270	20
	04/05/05	<40.0	<4.00	<1.00	<8.00	<100	<2.00	<4.00	<0.5	<4.00	<400	8.88J
	05/12/05	93.4	<4.00	<1.00	<8.00	<100	<2.00	8.87	<0.5	<4.00	2180	9.00J
	06/28/05	385	<4.00	<1.00	<8.00	226	<2.00	4.84	<0.5	4.98	2280	18.5
	07/12/05	841	<4.00	<1.00	11.6	633	<2.00	8.75	<0.5	7.97	2180	10.1
	08/09/05	204	<4.00	<1.00	10.3	<100	<2.00	8.85	<0.5	9.41	2850	8.44
	09/07/05	142	<4.00	<1.00	15	<100	<2.00	8.84	<0.5	15	2180	<8.00
	10/03/05	198	<4.00	<1.00	8.04	168	<2.00	8.3	<0.5	9.88	2380	8.81
	11/01/05	201	<4.00	<1.00	<8.00	210	<2.00	7.78	<0.5	7.16	2220	<8.00
	12/01/05	123	<4.00	<1.00	<8.00	<100	<2.00	8.31	<0.5	8.8	2200	<8.00
	01/05/06	544	<4.00	<1.00	8.7	195	<2.00	6.3	<0.5	8.7	2080	<8.00
	02/01/06	123	<4.00	<1.00	<8.00	<100	<2.00	6.24	<0.5	9.29	2260	<8.00
	03/01/06	140	<4.00	<1.00	<8.00	<100	<2.00	6.12	<0.5	4.35	2540	10.4
	04/04/06	245	<4.00	<1.00	<8.00	<100	<2.00	8.82	<0.5	11.4	3000	8.85
	05/02/06	133	<4.00	<1.00	<8.00	<100	<2.00	8.78	<0.5	8.38	2890	8.98
	06/08/06	82.6	<4.00	<1.00	<8.00	<100	<2.00	6.78	<0.5	<4.00	3150	8.27
	07/05/06	50.5	<4.00	<1.00	<8.00	<100	<2.00	6.84	<0.5	<4.00	3420	<8.00
	08/01/06	47.7	<4.00	<1.00	<8.00	<100	<2.00	6.57	<0.5	<4.00	3440	10.1
	09/07/06	288	<4.00	<1.00	<8.00	<100	<2.00	6.17	<0.5	<4.00	2910	11.7
	10/05/06	188	<4.00	<1.00	<8.00	<100	<2.00	24.0	<0.5	<4.00	3100	<8.0
	11/02/06	81.7	<4.00	<1.00	<8.00	<100	<2.00	5.8	<0.5	<4.00	3240	12.7
	12/07/06	76.1	<4.00	<1.00	<8.00	<100	<2.00	6.53	<0.5	<4.00	3440	14
	01/04/07	58.1	<4.00	<1.00	<8.00	<100	<2.00	6.12	<0.5	<4.00	3860	<12.8
	02/01/07	<51.2	<4.00	<1.00	<8.00	<100	<2.00	8.71	<0.5	<4.00	3490	<9.48
	03/01/07	<40	<4.00	<1.00	<8.00	<100	<2.00	6.32	<0.5	<4.00	3880	<12.6
	04/03/07	139	<4.00	<1.00	<8.00	<100	<2.00	6.41	<0.5	<4.00	4000	<12.6
	05/01/07	88.2	<4.00	<1.00	<8.00	<100	<2.00	6.87	<0.5	<4.00	4160	<12.6
	06/01/07	392	<4.00	<1.00	<8.00	<100	<2.00	7.34	<0.5	<4.00	4890	<12.6
	07/05/07	620	<4.00	<1.00	<8.00	<100	<2.00	6.78	<0.5	<4.00	4430	<8.0
	08/01/07	<107	<4.00	<1.00	<8.00	<100	<2.00	6.47	<0.5	<4.00	4380U	<18.9
	09/04/07	485	<4.00	<1.00	<8.00	<100	<2.00	9.1	<0.5	<4.00	4440	<10.3
	10/01/07	792	<4.00	<1.00	<8.00	601	<2.00	7.32	<0.5	<4.00	4450	13.8
	11/01/07	258	<4.00	<1.00	<8.00	282	<2.00	30.1	<0.5	<4.00	3540	22.1
	12/03/07	689	<4.00	<1.00	<8.00	782	<2.00	7.33	<0.5	<4.00	3430	<8
	01/03/08	529	<2.00	<1.00	<8.00	212	<2.00	6.29	<0.5	<4.00	4150	<10.8 U
	02/05/08	777	<2.00	<1.00	<8.00	711	<2.00	6.38	<0.5	<4.00	3320	<8.00
	03/03/08	76.7	<2.00	<1.00	<8.00	<100	<2.00	<7.51 U	<0.5	<4.00	2580	<17.3 U
	04/03/08	988	<2.00	<1.00	<8.00	646	<2.00	6.96	<0.5	<4.0	3160	12.2
	05/01/08	43.3	<2.00	<1.00	<8.00	<100	<2.00	5.47	<0.5	<4.0	4070	<8.00
	06/01/08	131	<2.00	<1.00	<8.00	<100	<2.00	11.7	<0.5	<4.0	4110	18

All concentrations are expressed in micrograms per liter (ug/l)

NJPQL=New Jersey Practical Quantitation Level

J=Indicates an estimated value.

U=Not detected above associated level; blank contamination exists

(1) Revised limits approved by NJDEP in June 2004 letter.

(2) Data obtained from TRC Baseline sampling on February 2002 and/or May 2003

Bold Value exceeds NJPQL

NA=Not Analyzed

ND=Not Detected

APPENDIX C

AREA 29 GROUND WATER REMEDIATION SYSTEM EFFLUENT FLOW DATA

TABLE 10
GROUNDWATER REMEDIATION SYSTEM EFFLUENT FLOW DATA
AREA 29 - WILLIAM J. HUGHES TECHNICAL CENTER

Date	pH	Specific conductance (mS/cm)	Daily Average Flow Rate (gpm)	Total Flow Discharged To Sprinklers (gallons)	Total Flow Discharged To Bio-Galleries (gallons)	Total Flow since Previous Date (gallons)	Estimated Total System Effluent Since Start-Up (gallons)
02/29/04	7.66	0.928	1.58	20,534	0	0	20,534
03/31/04	NR	NR	1.48	14,937	0	14,937	35,471
04/30/04	6.91	0.709	2.10	48,424	0	48,424	83,895
05/31/04	6.91	0.699	1.43	41,077	0	41,077	124,972
06/30/04	6.90	0.622	1.59	11,460	0	11,460	136,432
07/31/04	7.13	0.852	2.95	131,744	0	131,744	268,176
08/31/04	6.85	0.861	2.35	104,935	0	104,935	373,111
09/30/04	6.80	0.861	3.53	152,268	0	152,268	525,379
10/31/04	7.20	0.427	4.20	187,671	0	187,671	713,050
11/30/04	6.20	0.431	4.54	79,457	116,816	196,273	909,323
12/31/04	7.48	0.737	3.81	21,869	148,099	169,968	1,079,291
01/31/05	7.33	0.723	4.19	0	187,034	187,034	1,266,325
02/28/05	7.26	0.696	3.99	0	161,009	161,009	1,427,334
03/31/05	7.55	0.696	4.27	38,149	152,587	190,736	1,618,070
04/30/05	7.38	0.676	5.77	249,426	0	249,426	1,867,496
05/31/05	7.09	0.372	5.40	241,089	0	241,089	2,108,585
06/30/05	8.20	0.597	2.86	123,608	0	123,608	2,232,193
07/31/05	7.38	0.727	5.09	227,425	0	227,425	2,459,618
08/30/05	7.40	0.707	5.68	253,644	0	253,644	2,713,262
09/30/05	7.3	0.720	4.26	184,127	0	184,127	2,897,389
10/31/05	7.17	0.731	4.00	161,426	0	161,426	3,058,815
11/30/05	7.1	0.713	3.22	101,377	37,793	139,170	3,197,985
12/31/05	7.01	0.686	2.33	0	104,081	104,081	3,302,066
01/31/06	6.5	0.698	1.68	0	169,066	169,066	3,471,132
02/28/06	7.15	0.679	4.25	0	171,358	171,358	3,642,490
03/31/06	5.98	0.683	4.36	0	194,509	194,509	3,836,999
04/30/06	7.13	0.519	3.97	0	171,400	171,400	4,008,399
05/31/06	8.26	0.537	4.46	150,796	53,982	204,778	4,213,177
06/30/06	7.38	0.584	4.84	209,989	0	209,989	4,423,166
07/31/06	7.06	0.554	5.06	218,677	7,204	225,881	4,649,047
08/31/06	7.33	0.573	3.79	51,063	112,335	163,398	4,812,445
09/30/06	7.11	0.669	4.94	213,235	0	213,235	5,025,680
10/31/06	7.11	0.668	3.80	0	164,222	164,222	5,189,902
11/30/06	7.45	0.568	3.00	20,766	108,964	129,730	5,319,632
12/31/06	8.22	0.530	3.45	149,103	0	149,103	5,468,735
01/31/07	7.41	0.294	3.66	0	158,315	158,315	5,627,050
02/28/07	5.99	0.578	2.85	0	123,308	123,308	5,750,358
03/31/07	8.15	0.519	3.59	0	155,149	155,149	5,905,507
04/30/07	7.87	0.720	3.00	0	129,690	129,690	6,035,197
05/31/07	7.98	0.643	3.23	51,204	88,197	139,401	6,174,598
06/30/07	8.5	0.501	3.79	163,524	0	163,524	6,338,122
07/31/07	7.65	0.682	3.91	168,712	0	168,712	6,506,834
08/31/07	7.86	0.633	3.71	160,202	0	160,202	6,667,036
09/30/07	7.01	0.688	3.62	156,243	0	156,243	6,823,279
10/31/07	7.19	0.865	3.61	156,097	0	156,097	6,979,376
11/30/07	7.18	0.610	2.62	281	113,049	113,330	7,092,706
12/31/07	7.85	0.617	2.75	0	118,792	118,792	7,211,498
01/31/08	7.33	0.630	2.80	0	121,169	121,169	7,332,667
02/29/08	7.42	0.634	2.67	0	115,457	115,457	7,448,124
03/31/08	8.4	1.120	2.84	0	122,839	122,839	7,570,963
04/30/08	7.88	0.698	3.60	140,010	15,571	155,581	7,726,544
05/31/08	7.34	0.551	3.38	146,086	0	146,086	7,872,630
06/30/08	7.47	0.605	3.23	139,677	0	139,677	8,012,307

APPENDIX D

**AUGUST 2008 METALS CONCENTRATIONS IN
29-MW16S, 29-MW17S, 29-MW18S, AND 29-MW19S**

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT

Client: URS Construction Services

Project: AREA 29 MONTHLY 41554977.029

Lab Case No.: E08-08950

PARAMETER(Units)	Lab ID:	08950-005	08950-006	08950-007	08950-008			
	Client ID:	29-MW16S-88	29-MW17S-88	29-MW18S-88	29-MW19S-88			
Matrix:	Aqueous	Aqueous	Aqueous	Aqueous				
Sampled Date	8/4/08	8/4/08	8/4/08	8/4/08				
Conc	Q	MDL	Conc	Q	MDL			
Metals (Units)	<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>	
Calcium	256	200	449	200	447	200	318	200
Chromium	ND	8.00	ND	8.00	ND	8.00	ND	8.00
Cobalt	ND	8.00	ND	8.00	ND	8.00	ND	8.00
Copper	ND	8.00	ND	8.00	ND	8.00	ND	8.00
Iron	ND	100	ND	100	ND	100	ND	100
Lead	ND	2.00	ND	2.00	ND	2.00	ND	2.00
Magnesium	603	200	495	200	1210	200	875	200
Manganese	ND	4.00	6.51	4.00	ND	4.00	6.12	4.00
Mercury	ND	0.500	ND	0.500	ND	0.500	ND	0.500
Nickel	ND	4.00	ND	4.00	ND	4.00	ND	4.00
Potassium	464	200	562	200	863	200	689	200
Selenium	ND	8.00	ND	8.00	ND	8.00	ND	8.00
Silver	ND	2.00	ND	2.00	ND	2.00	ND	2.00
Sodium	1880	400	2900	400	3350	400	5670	400
Thallium	ND	0.400	ND	0.400	ND	0.400	ND	0.400
Vanadium	ND	8.00	ND	8.00	ND	8.00	ND	8.00
Zinc	13.7	8.00	36.9	8.00	9.79	8.00	14.3	8.00

PARAMETER(Units)	Lab ID:	08950-009	08950-010		
	Client ID:	29-FB080408-88	29-TB080408-88		
Matrix:	Aqueous	Aqueous			
Sampled Date	8/4/08	8/4/08			
Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)	<i>(ug/L-ppb)</i>		<i>(ug/L-ppb)</i>		
Chloromethane	ND	0.330	ND	0.330	
Vinyl chloride	ND	0.310	ND	0.310	
Bromomethane	ND	0.220	ND	0.220	
Chloroethane	ND	0.330	ND	0.330	
Trichlorofluoromethane	ND	0.550	ND	0.550	
Acrolein	ND	3.87	ND	3.87	
1,1-Dichloroethene	ND	0.400	ND	0.400	
Methylene chloride	ND	1.98	4.63	C	1.98
Acrylonitrile	ND	1.86	ND	1.86	
trans-1,2-Dichloroethene	ND	0.350	ND	0.350	
1,1-Dichloroethane	ND	0.330	ND	0.330	
Chloroform	ND	0.140	ND	0.140	
1,1,1-Trichloroethane	ND	0.200	ND	0.200	
Carbon tetrachloride	ND	0.160	ND	0.160	
1,2-Dichloroethane (EDC)	ND	0.230	ND	0.230	
Benzene	ND	0.180	ND	0.180	
Trichloroethene	ND	0.340	ND	0.340	
1,2-Dichloropropane	ND	0.210	ND	0.210	
Bromodichloromethane	ND	0.210	ND	0.210	
2-Chloroethyl vinyl ether	ND	0.240	ND	0.240	
cis-1,3-Dichloropropene	ND	0.220	ND	0.220	
Toluene	ND	0.160	ND	0.160	

ND = Analyzed for but Not Detected at the MDL

C = Common Laboratory and/or Bottle Contaminant.

Continued on Next Page